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THE PRINCIPLES OF EDUCATION

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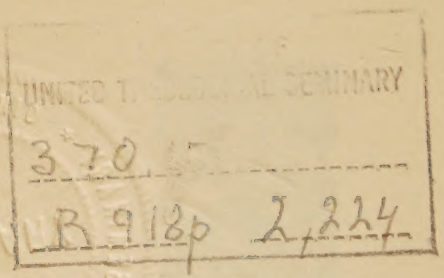

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PREFACE

THE aim of this book is to present an outline of the Principles of Education for use in college and normal school classes, in reading circles, and in the teacher's private professional reading.

After an introductory chapter which aims to orientate the student in the field of education, the book attempts to bring together and organize the leading tendencies in modern educational thought pertaining to the bases, aims, values, and essential content of education; to discuss the principles underlying the administration of the curriculum; to inquire into the agencies that educate; and to review the fundamental psychological principles that underly the teaching process. The standpoint of no particular philosophical system is adopted, but the material is presented from the point of view of inductive science.

Because footnotes are distracting to many readers, a definite attempt has been made to reduce their number to the minimum. All explanatory material has been woven into the text, while the sources of quotations and most of the references to educational literature have been indicated within the text by means of key numbers, placed in parentheses, that refer to the Bibliography on pages 297–300. The first of these numbers is the number assigned to the reference, while the second gives the page within the reference. Thus, (50 : 85) would refer to McMurry's "How to Study," page 85.

In the Bibliography only those titles are included that are referred to in the text, and those that are given in the collateral reading at the close of the chapters. The titles are arranged in alphabetical order and are numbered consecutively.

At the close of nearly every chapter have been placed exercises for study and discussion. These exercises do not consist of questions on the text, but they aim rather to give problems that call for the application of the principles developed in the text. It is obvious that, for want of space, principles cannot be applied very extensively within a text itself, but as their application forms one of the most valuable parts of any theoretical course, this should be provided for by means of exercises. These exercises bring in the element of concreteness and should receive no less conscientious attention than the text itself.

The book was read in manuscript by Professor Ezra Allen, of the School of Pedagogy, Philadelphia; by Miss Frances Jenkins, Supervisor of Elementary Grades, Decatur, Illinois; by Miss Alice Sinclair Botkin, of the Central High School, Washington, D. C.; and by my wife, Hazel Pietsch Ruediger, to each of whom I cheerfully express my thanks for valuable suggestions. To my wife I am further indebted for assistance in proofreading.

W. C. R.

The George Washington University,
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THE PRINCIPLES OF EDUCATION

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CHAPTER I

INTRODUCTION: THE TEACHER'S PROFESSIONAL CURRICULUM

1. **The Need of Orientation.** It is well when beginning to work in a new department of knowledge to orientate one's self by taking a brief view of the entire field of which the particular subject in hand forms a part. Any one field of knowledge, such as history, science, or medicine, while it forms an inherent unity, is nevertheless so large and has such a diversity of aspects that it cannot be efficiently pursued as a whole. It must be broken up into separate subjects, but when this is done, the unity of the whole is likely to be lost to view, with a distinct detriment to the student's full appreciation of the separate parts. One subject cannot be properly assimilated without knowing in some measure its relation to the other subjects, together with which it forms a larger whole.

What is true of departments of knowledge in general is true of education in particular. This field has in recent years developed into such large proportions, and is in addition so highly diverse, that it must be broken up into a number of separate subjects in order to be effectively mastered. But this process is again likely to cause the student to lose sight of the forest for the trees.

This danger is enhanced in education by the unsettled, and even chaotic, nature of the field as a whole — a condition owing to its comparative newness. The exact study of educational problems and the professional training of teachers, especially as concerns secondary and higher education, are still in their initial stages. This manifests itself in the lack of a common technical nomenclature, and in the fact that the boundary lines between the different subjects are seldom drawn twice at the same points. A student who has taken an educational subject in one school may be obliged to cover much of the same ground again when taking a different subject in another school; and the term "principles of education," for example, may mean one thing in one place and quite a different thing in another place. To have these facts impressed upon one's mind, one needs only to inspect the catalogues of half-a-dozen universities having teachers' courses.

The problem of the content of the educational field may be effectively approached by asking of what the professional training of the teacher should consist. What are the activities for which the teacher in training must prepare, and what are the subjects that will minister to this preparation? This question may be asked here just as it may be asked for the prospective physician, lawyer, or engineer. In each case the answer ultimately consists of a list of subjects and practices that cover the various aspects of the student's later professional activities.

2. Trades and Professions Distinguished. A student who is seriously preparing for the calling of teaching should realize at the outset that he is preparing to enter one of the professions. But before he can appreciate

the significance of this assertion he must understand what is meant by a professional, as distinct from a non-professional, calling; that is, he must understand the difference between a profession and a trade. Wherein do such callings as medicine, engineering, and architecture, on the one hand, differ from such callings as carpentering, blacksmithing, and cobbling, on the other? Clearly it takes longer to perfect one's self in those of the first group than in those of the second, but this is not the heart of the difference between them; it is only a result of this difference. The heart of the difference between them appears to lie in the fact that a profession is guided by fundamental principles and laws of nature, while a trade is guided merely by rules and directions. These rules and directions may ultimately rest on natural laws and principles, but the tradesman need not be aware of this, neither need he have a systematic conception of them. The carpenter following the plans of the architect may do so by rule of thumb, and the cobbler and the blacksmith may, and usually do, learn their trades by following rules and directions spasmodically given. The sciences that ultimately dictate these rules and directions they need not understand, and they may even be unaware of their existence.

But in the callings to which we attach the term professional, the situation is radically different. The successful architect cannot make his plans by rule of thumb. He can seldom use the same plan twice, or adopt the plan of another, but he is continually called upon to produce something new, or at least to vary his plans in some significant degree. In doing this he is guided by the abstract principles of a number of sciences, especially mechanics and æsthetics, and he is obliged to pos-

sess a certain amount of skill in drafting and sketching. In order to have the principles that he uses effectively at his command, he must have complete and systematic conceptions of the sciences to which they belong, and he must also master in a systematic manner a conspicuous amount of technic in learning to draft and to sketch. All this not only takes time, — time measured by years rather than by weeks or months, — but also arduous study and painstaking practice.

What is true of architecture is true correspondingly of medicine, engineering, teaching, and the rest of the professions. Every profession involves both theoretical and practical aspects that must be systematically acquired to be maximally serviceable. Medicine is ultimately based on such sciences as chemistry, botany, zoölogy, bacteriology, anatomy, and physiology, while engineering rests on physics, mechanics, chemistry, geology, and astronomy. But a knowledge of these sciences in themselves does not make the professional man. These sciences do little more than lay the basis for professional study. In medicine, bacteriology, anatomy, and physiology lay the basis for pathology ; botany and chemistry for *materia medica ;* anatomy and physiology for surgery, and so on. But even these professional subjects do not complete the circuit in the training of the physician and surgeon. These subjects must be liberally and systematically supplemented by attendance upon clinics and by actual practice under guidance. A hospital appointment is beginning to be looked upon as not only desirable, but as essential in the rounded training of the doctor of medicine ; and the engineer must pass through three corresponding phases of culture.

Now the point of this discussion is that preparation,

not only for medicine and engineering, but for all the professions, teaching included, involves these three phases of culture. Every profession is based upon a number of the pure sciences that must be mastered, it demands the comprehension of a body of professional theory in the form of applied sciences, and it requires systematic training or practice under guidance.

3. The Teacher's Training: Academic Specialization. From these threefold requirements, teaching as a profession is not only not exempt, but it may be said to involve four, instead of three, distinct phases of professional culture. The additional phase is academic specialization. In common with all men that occupy positions of trust and responsibility in the community, the teacher needs breadth of culture, both to enrich his own life and to become an agreeable and generally influential member of society; but mere breadth of culture is not sufficient for him. Practically every teacher above the elementary school specializes in the subjects that he teaches, and where departmental teaching prevails, this specialization is present also in the elementary school. Supervisors of music, drawing, manual training, and the like, are obviously specialists. But all teachers, including even those of the primary grades, are vitally concerned in the teaching of subject-matter, thus using at least a part of what they have learned in a professional way by making it their business to impart it to others. The subjects that a teacher teaches form the stock in trade that he uses in plying his vocation, and they must, for him, be regarded as professional.

The professional aspect of a part of the academic work of the teacher is recognized by teachers' training schools in two ways. It is recognized by providing pro-

fessional reviews in the subjects that the student will be called upon to teach, and by arranging the work so that a large part of it will be grouped about a few related topics, usually one major, and one or two minors. The former practice is most common in normal schools, although not restricted to them, while the latter is prevalent in colleges. The specialization provided for by colleges not only insures adequate preparation in the student's specialty, but it also serves the ends of culture most effectively. In order to be socially effective and personally satisfactory, one's knowledge must be unified, and for this unification a core composed of the intensive study of at least a few subjects is necessary.

The amount of academic preparation that the teacher needs is quite indeterminate. It necessarily varies with the grade of school and the subjects that he wishes to teach. In general it may be said that the teacher should not only know the subjects that he wishes to teach, but also those upon which these subjects depend and those that are in other ways closely related. The teacher of English, for example, should know some of the ancient and other modern languages, and the teacher of arithmetic should know at least algebra and geometry. No definite standards for the various grades of school have as yet been evolved in this country, although they are becoming manifest in several directions. For reasons of ease in application, these standards are by custom measured by time, rather than by academic prescriptions, but not without losing sight of the academic needs. It is quite generally demanded now that the grade teachers in city systems, and even in progressive country districts, have at least a normal school diploma. This diploma stands for approximately two years of prepara-

tion beyond the four-year high school. These two years include the time for the more strictly professional subjects, to which about half the student's energy is given. For country school teachers a less amount of preparation is being provided in some places, notably in Wisconsin. This is done by means of county training schools, which admit from the eighth grade, and grant a diploma after the completion of a two-year course. Similar courses are also provided in some of the normal schools in various parts of the country, and not a few of the high schools offer elementary work in pedagogy suitable for the teacher of a district school.

For high school teachers, preparation equivalent to the standard bachelor's degree is being more and more demanded. Rules making this demand obligatory are now on the minutes of many school boards. This is the minimum. For the high schools in the larger cities, applicants holding the master's, and even the doctor's, degree are preferred.

4. Basal Subjects. Among the subjects that bear so close a relation to the professional training of the teacher that they may be said to form its base should be mentioned biology, sociology, philosophy, logic, ethics, and psychology. Education is largely a biological and sociological function, and therefore it is highly desirable that the teacher should include in his academic preparation introductory courses in biology and sociology. Sociology, assisted by biology, lays the foundation for the appreciation of the meaning, aim, and value of education; and biology in addition lays the basis for psychology, makes explicit the fundamental principles of development, and introduces the student to the evolutionary point of view, without which one cannot fully

understand education or have a sympathetic appreciation of modern culture. Some physiology and neurology are needed as a basis for psychology and school hygiene, but it may not be necessary to provide for these subjects explicitly in the teacher's course. Physiology is so generally included in our schools that an elementary knowledge of the subject may usually be depended upon, while the text-books in psychology usually cover the needed parts of neurology.

Ethics, logic, and philosophy are also desirable as elements in the teacher's training. The history of philosophy gives a conspectus of the development of man's conception of the meaning and value of reality, life, and mind, and so forms an almost indispensable correlate of the history of education; logic, inductive and deductive, is necessary for the thorough understanding of the typical methods of instruction; while ethics supplies some essential elements for the aim of education, and is needed every day in the schoolroom. A study of the problems of philosophy serves to bring out the interrelationships and the ultimate nature of the detached elements of knowledge dealt with by the various school subjects, and therefore is of great value to the teacher in making all of his instruction more vital and meaningful.

Psychology may be said to form the connecting link between the basal and the professional subjects in the teacher's course. As a pure science it belongs logically in the basal group, but its value to teachers is so great that for reasons of expediency it is usually classed with the professional subjects. The subject gives a knowledge of the known facts and principles of the mind, and as it is the teacher's immediate function to bring about mental changes, — changes pertaining to both

knowledge and character, — he must know psychology if he wishes to proceed intelligently. Mere empirical knowledge is as inadequate here as it is in agriculture, medicine, or engineering. Just as the engineer profits by the facts and principles of mechanics, so the teacher profits by the facts and principles of psychology.

A subject that is still more closely related to the professional subjects for teaching than general psychology is child psychology. This subject is usually pursued as a pure science, and for the purpose of obtaining guiding principles for teaching in one and the same class; hence it is immaterial in which group it is classified. Because the subject is still in the process of emerging from the pupa state of "child study," it does not yet command the full respect of scholars, but it presents a body of facts and principles of which no teacher can afford to be ignorant. The teacher deals not only with mind, but with child mind, which makes the subject particularly valuable for elementary and for high school teachers. It concerns high school teachers because it treats the period of adolescence, the period of development in which practically all high school students find themselves.

5. Professional Subjects. The distinction between, and the relation of, the basal and the professional subjects have been implied throughout the preceding section. These two groups are distinguished by the fact that the basal subjects always consist of pure sciences, or subjects that deal with knowledge in a primary way for the purpose of rationalizing it and making it explicitly intelligible, while the professional subjects consist of applied sciences, or subjects that deal with knowledge in a secondary way for the purpose of applying it consistently and effectively to the practical problems

of life. As examples of the basal subjects may be mentioned mathematics, physics, psychology, logic, and history; and of the professional subjects, Steam Engineering and the Principles of Teaching. The interrelation of the two groups is made evident by the examples given. The professional subjects get their data from the basal subjects. Thus Steam Engineering gets its data from mathematics and physics, while the Principles of Teaching gets its data primarily from psychology and logic. One applied science is usually based on a number of pure sciences.

Education as a professional study and practice has (1) a theory of aims, values, and content; (2) a theory of instruction and training; (3) a history; (4) a theory of management and control; and (5) a technic of practice. The efficient teacher (1) must know the end he is striving to achieve and what the values of the various studies are in ministering to the achievement of that end; (2) he must know the principles of effective instruction and of the development of character; (3) he must understand the historical development of his calling; (4) he must know how to manage a school economically as regards time, energy, and health, and how to coöperate intelligently with his professional superiors and with the community; and (5) he must possess trained skill in applying the facts and principles involved in the topics just mentioned.

The subject that deals with the aims, values, and content of education is now usually called Principles of Education. This subject gets its data chiefly from biology, sociology, psychology, and ethics, and it tells us of the biological bases of education, of the place that education does and should hold in society, of the end

that it is trying to achieve, of the elemental values that are used in the selection of subject-matter, and of the essential content and significance of the curriculum. It is the broadest and most unifying subject in the teacher's professional curriculum, and for that reason some prefer to call it "philosophy of education." The pages of this book are occupied primarily with this subject.

To the student who is going to be engaged principally as a classroom teacher it may seem that a knowledge of the aims, values, and content of education will be of but little practical use. He may observe that the subject-matter of the curriculum is determined by those higher in authority and by social forces outside the school, and that the teacher usually has little power to modify it. But this does not constitute a ground for his remaining ignorant of its underlying principles. A teacher cannot work intelligently in any part of the school system without appreciating in some definite degree the purpose and function of education as a whole. He is no mere wheel in a machine, but an intelligent worker, aiming to assist in the achievement of the purpose of the whole.

Methods of teaching, too, are in many instances dependent upon what one understands to be the aim of education. A teacher who conceives the aim of education to be acquaintance with environment is likely to teach physics, for example, quite differently from one who conceives the aim to be mental discipline. It is because of this relation that the Principles of Education should logically precede the Principles of Teaching.

The subject that deals with the theory of imparting instruction and of developing character is now usually

called either Principles of Teaching or Educational Psychology. The subject applies the facts and principles of psychology to teaching, which in so far justifies the latter designation, but it does not get all of its data from psychology. As we have just seen, it gets some from the Principles of Education, while logic furnishes others. What we literally have here are the principles of teaching, or of imparting instruction, and therefore the former designation is logically the better one. (See p. 174.)

The function of the Principles of Teaching is to assist the teacher in becoming an intelligent, resourceful, and progressive worker in the immediate task of classroom teaching and of training in conduct. The Principles of Education and the Principles of Teaching have been tersely distinguished by saying that the former deals with the *what* and *why* of education, while the latter deals with the *how* (76 : 2).[1] Together these two subjects form the backbone of the teacher's professional curriculum on the theoretical side.

The History of Education is a subject whose nature is sufficiently explained by its title. The subject gives a view of what education has been in the leading nations and epochs of the past, what aims and methods have been dominant and why, what have been the causes of success and of failure, and how the present problems, aims, and practices of education have come into existence. Little that is presented is directly applicable in practice, but its value, both to the individual teacher and to the profession, is great, nevertheless. (1) It gives a common

[1] These figures refer to references given on pages 297–300. The first number refers to the number of the reference and the second to the page in the reference.

historical background to the profession, thus adding conventional elements to the teacher's life, and ministering to the social consciousness and professional spirit of the group; (2) leaders like Socrates, Pestalozzi, and Horace Mann serve as an inspiration to all who make their real acquaintance; and (3) educational values and practices are seen not to be absolute and fixed, but relative to the social and political life of the times, although the underlying principles are ever the same. On the more practical side the subject (4) aids in selecting successful and in discarding unsuccessful methods; and (5) it helps in understanding a variety of pending problems that cannot be adequately understood or managed without a knowledge of their historical origin and growth. Such problems are the doctrine of formal discipline, the relation of interest and effort, the teacher's attitude toward the child, and the place of the classical languages in the curriculum.

The theory of management and control in education may be split up into four distinct subjects, but by forming combinations they are in actual teaching frequently reduced in number to three, or even two. The four subjects are School Management, School Hygiene, School Administration, and School Supervision.

School Management, also designated Classroom Management and School Economy, deals with the principles and practices of managing the classroom with a minimum of friction and loss of time. Its aim is quick, quiet, and harmonious control. The teacher in training can gain much here from the experiences and experiments of others as recorded in text-books, and without the knowledge so gained he is likely to commit many blunders that he might otherwise have avoided. School Law is

frequently treated in connection with School Management, but it may also be combined with School Administration.

School Hygiene deals with the physical care and welfare of the pupils of the school, and through them reaches the home and society at large. It is closely related to school management, with which subject it is often combined. As an element in the teacher's training, this subject is still far from having achieved the recognition it deserves. The teacher needs not only to know the psychology of nourishment and fatigue, how to adjust desks, how to heat and ventilate a schoolroom, but also how to test for defects in the senses and the nasal passages, and how to detect the beginning of certain contagious diseases. To this end it would be well to have the course given by one who has taken a degree in medicine; but if this cannot be had, it should be given by one who has at least had thorough training in general bacteriology, physiology, and psychology.

School Administration deals, or should deal, with a comparative study of the organization, administration, and support of state, city, county, district, and foreign school systems. It has to do with the getting together of the educational plant, and with the operation of that plant on the social or external side. In this respect it forms the complement of Management and Supervision.

School Supervision is only just beginning to be differentiated from the somewhat amorphous fields of Administration and Management. It is of most vital concern to superintendents and principals, but it is well for all teachers to be acquainted with its leading principles, so that they may be better able to work in intelligent and sympathetic harmony with the efforts of their supervisors.

We have now in a brief way discussed four out of the five topics that we mentioned on page 10 as comprising the nodal points in the teacher's training in professional theory and practice. The topic that we have not yet discussed is the technic of practice. This should logically be discussed next, but it is seldom that the transition from theory to practice is made as abruptly as the interrelation of these topics would indicate. Between theory and practice one or two additional subjects are usually interposed, thus breaking the abruptness of the transition. These subjects may be designated Special Method and Professional Reviews.

There is as yet no clear line of demarcation between Special Method and Professional Reviews, and by some these terms are used synonymously. As here used, the term "professional reviews" applies to courses that are devoted primarily to the review of subject-matter, while "special method" applies to those courses whose function it is to select the appropriate elements from the other professional courses pursued, and to focus them down to the problems that a particular group of students will meet. The contents of any particular course in Special Method will needs vary with the grade and type of school in which the members of the class are preparing to teach. This gives us courses in secondary education, elementary education, industrial education, the teaching of English, and so on.

The courses in Special Method naturally come late in the teacher's training. They should come after most of the other theoretical subjects have been completed, for they rest upon them. But students usually want to rush into this work first, thinking that learning to teach is learning some knack or device instead of the application

of laboriously acquired principles. There is no short cut to intelligent teaching.

Professional Reviews we have briefly discussed under academic specialization in section three, where the subject properly belongs.

The practical side of the teacher's training is supplied by Observation and by Practice Teaching. The systematic observation of expert teaching forms an indispensable introduction to, and accompaniment of, the practice teaching, and it is also essential for the appreciation and assimilation of educational theory. The work is more easily provided for than the practice teaching, and about eighty-five per cent of the colleges and universities having teachers' courses offer it (26 : 39 f.).

The capstone of the teacher's training is formed by the course in practice under guidance. This is as essential in the right training of the teacher as the hospital practice is for the physician or the shop work for the engineer. Without it the student feels no vital need for the theoretical work, and so cannot properly assimilate and retain it. It might even be maintained that without it the student had better go out and get some practical experience before systematically taking up the professional work. Even a year of teaching goes far in laying the basis for the assimilation of theory. But beyond question, the best method is to let the practice run alongside of the later theoretical work.

By having the first teaching done under intelligent and sympathetic guidance, much is gained for the teacher. (1) He will be led to form the connection between theory and practice, and (2) he will be started off with right teaching habits. In the writer's experience as a supervisor of practice teachers, he could almost invariably tell

whether a student had taught before or not, even though he had no previous knowledge of the fact. He could do this by the difficulty that was experienced in breaking habits, such as repeating the answers of the pupils. If a student had taught much, it seemed in many cases quite impossible to reform habits.

The connection between theory and practice is seldom formed effectively by the student himself. He may know all about the theory of the development, study, review, and drill lessons, but without assistance he wastes much time in learning where and how to apply this theory, and often fails altogether. The work is universally required in normal schools, and about sixty per cent of the universities having teachers' courses also offer it (21, 23, and 26 : 3 f.).

6. Graduate Work. It has been the aim here to present an outline only of the undergraduate work in the teacher's course. In the graduate department a variety of other courses is naturally provided, and considerable deviation may prevail. Still, even graduate work is not entirely chaotic. It naturally falls into two or three cycles. The first cycle should lead the student into a broad acquaintance with his specialty, introducing him particularly to special treatises and to monographic literature; the second cycle should instruct him in methods of research and give him practice therein, carrying along with this a review of the literature of the special topics investigated; and if a third cycle is provided, it should be a seminar where students and teachers come together for the discussion and criticism of original work.

7. Summary. The teacher's professional curriculum as discussed in this chapter may be summarized by the following outline: —

- 1. Academic Preparation
  - General Culture
  - Professional (Specialization and Reviews)
  - Basal Subjects
    - Biology
    - Sociology
    - Philosophy
    - Ethics
    - Logic
    - Psychology
    - Child Psychology
- 2. Professional Theory
  - Principles of Education
  - Principles of Teaching
  - History of Education
  - School Management
  - School Hygiene
  - School Administration
  - School Supervision
  - Special Method
- 3. Technic of Practice
  - Observation
  - Practice Teaching

EXERCISES

1. Name some callings that are on the road toward becoming professions.

2. What topics should the college course in secondary education discuss?

3. What is genetic psychology? Should it have a place in the teacher's curriculum?

4. What are the relative functions of the normal school and the college in the training of teachers?

5. How much time should be given to each of the subjects in the teacher's professional curriculum?

6. For whom would professional reviews be more necessary, for elementary or for high school teachers? Why?

7. To what extent should the academic subjects in the teacher's course be prescribed and to what extent elective? The professional subjects?

8. Compare the technical professional training needed by the following: teacher, lawyer, engineer, physician, farmer, clergyman, business man.

9. In the teacher's course, should the professional work follow or run parallel with the academic work? In the medical course? In the engineering course?

10. Where is the professional training of the teacher needed most, in the grades, the high school, or the college? Why? To what extent is professional training now required for these three types of schools?

11. If the professional work outlined above is too extensive for normal schools, how might it be abridged? Should it, perhaps, be supplemented? If so, how? Might another subject, called perhaps General Method, be placed between the Principles of Teaching and Special Method?

COLLATERAL READING

BROWN, The American High School, 193–220.
HANUS, A Modern School, 251–284.
HORNE, Philosophy of Education, 1–17.
HORNE, Psychological Principles of Education, 23–29.
Report of Committee of Fifteen, 19–39.
THORNDIKE, Principles of Teaching, 1–10.

CHAPTER II

THE BIOLOGICAL BASES OF EDUCATION

8. Man and the Animal Series. Education is fundamentally a biological process, and is made possible by biological conditions. Man is no longer regarded as standing off from the rest of creation, subject to laws and influences peculiar to himself, but he is now regarded as an integral part of the animal series, subject to the laws and conditions of that series. He is the highest product of evolution, and differs from the other animals only in degree. His bodily equipment is manifestly similar to that of the other vertebrates, the similarity increasing as one ascends in the animal scale, but there is every reason to think that the similarity extends to the fundamental psychological powers and instincts as well. Man has no more sense organs than the other animals, and it is highly probable that he is supplied with no fundamental impulse or capacity that is not present at least in embryo in the other vertebrates. In the powers of knowing and of refined feeling he probably always takes first place, but this is not necessarily true in the powers of sense. The eagle outranks him in acuity of vision, and the dog has a keener sense of smell.

9. Development of Instinct and Intelligence. The powers that have given man the advantage over the lower animals are mental rather than physical. They have resulted from the influences of natural selection acting upon chance variations in the cerebrum. This organ has been

developed in man much farther than in any other animal, and with this development man's mental powers have kept pace. The hemispheres have become the organs of intelligence and free ideas, aware of the aims and conditions of life. They have become a storehouse for knowledge, and are therefore the basis for the capacity for education. They are the physical substratum of the mind of man with its powers of retention and organization, of reason and deliberation, of making a permanent objective record of experiences, of communication, and of refined feeling. Man is thus enabled to conserve the achievements of the race, which makes possible a social-historical life of progress no longer solely dependent upon the chance variation in anatomical structure.

Just where in the animal series the factor of intelligence, or the capacity to profit by experience, begins, it is difficult to say. It is probably not entirely absent anywhere, but it does not become conspicuous until we come to the vertebrates. The behavior of the animals below the vertebrates, and much of that of the vertebrates, is more akin to that of machines than that of rational beings. They all, except the very lowest, have some kind of nervous systems, but these work mechanically, and are seldom, if ever, guided by conscious choice. They are little more than paths for the ready transmission of stimuli, and centers for their coördination. When light stimulations strike the eye of an insect, such as a moth, they mechanically set off adjustments that carry the insect straight toward the source of the stimulations. If the insect gets burned, it appears to have little, if any, power to profit by that experience in the future. A slight burn will redirect its flight, but that, too, appears to be done mechanically.

The basis of instinct, as of all mental activity, is, of course, the nervous system. Were the histology of the brain and nerves sufficiently known, we could speak of instincts, thoughts, and feelings in terms of nerve structure and nerve action. There is a physical basis for mental function just as there is for physiological function. An animal is as much provided by heredity with its capacities to feel and to act on the basis of nerve impulses as it is with capacities to breathe, to eat, and to digest food. Both equally and similarly follow the laws of hereditary transmission and of variation. They have both come into existence through variation and selection. The basis of selection has been adaptation to environment in one as in the other.

The primordial variation toward differentiated nerve tissue in the multicellular hydroids proved to be a variation in the right direction. It was not only selected, but it continued to vary in the direction in which it made so happy a start. The nerve structure and the parallel instinctive adaptations have become ever more complex, till they have given us the variety of instinctive responses that we see in the animal world about us.

But variations in mere instinctive or mechanical complexity were not allowed to monopolize the field. At some point there appeared a variation, inherent in the nervous system like the rest, that enabled the animal to profit by the experiences of the past. This was the birth of intelligence. Like the appearance of the first nerve tissue, this variation prospered, was selected, and continued to vary manward. Its development has released man from the dependence on blind instinct for adaptation to his environment, and has made it

possible for him to guide his life largely by means of knowledge. But it should not be understood that the feeling instincts have been eliminated by this guidance. On the contrary, these instincts have apparently kept pace with the intellect in their development, and they continue to play a most fundamental rôle in the life of man. It would not be far from the truth to say that they *are* the life of man that is guided by means of knowledge and intelligence.

With the growth of the hemispheres and the consequent development of intelligence there has come a reduction of the number of reflex and instinctive adjustments inherent in the lower centers. Those adjustments that need to be unhesitating and reflex, such as the heart beat and the control of digestion, have been retained by the lower centers, but those that may participate in the conscious adjustment to a varying environment have been passed forward to the hemispheres. "In this way it might come about that in man and in monkeys the basal ganglia should do fewer things by themselves than they can do in dogs, fewer in dogs than in rabbits, fewer in rabbits than in hawks, fewer in hawks than in pigeons, fewer in pigeons than in frogs, fewer in frogs than in fishes, and that the hemispheres should correspondingly do more" (39: 79). The significance of this for education is at once evident. While certain adjustments have been left to the realm of unconscious and mechanical control, others have become amenable to the guiding influences of knowledge and intelligence, and so to education.

The advantage of the combination of instinct and reflective intelligence over instinct alone is thus not hard to see. It enables a power of adaptation to a complex

and variable environment for which the mechanical adaptation of instinct alone, no matter how complex, would be quite unequal. In making his adaptations, man is not restricted to the guidance of his own past experiences, but those of others and of generations gone before are likewise open to his appropriation. The ultimate function of knowledge is to modify action, to enable better adaptation to environment and life. Unless knowledge has resulted in improved action, or has made the recipient a better person to live with, the effort in imparting and acquiring it has been wasted, so far as society is concerned at least. Educated mind is the most efficient organ of adaptation that man has. It has enabled him to survive, to multiply, and to subdue the earth in spite of the greater strength, endurance, swiftness, and keenness of sense of many of the lower animals.

10. **Limitation and Specialization of Powers.** But while nature has dealt generously with man in his endowment of educational capacity, we must not lose sight of the fact that this endowment is neither uniform nor unlimited. As we go from person to person, we find that powers are both specialized and of varying degrees of strength. There are some who have ten talents, some who have five, and some who have only one, and the talents vary greatly in coinage. Those of one will purchase ability in science, those of another in literature, those of another in business, and so on; and there are limits to the purchasing power of all. Education reveals many inequalities for which it is in no wise to blame, and which it is powerless to remove. All it can do is to furnish the opportunities and conditions for acquisition, but both the amount and the direction of acquisition

are relative to the capacity or individuality of the person concerned. This has long been recognized, and it has been well expressed by Rosenkranz, who says: "Whatever does not exist in this individuality as a possibility cannot be developed from it. Education can only lead and assist; it cannot create. What nature has denied to a man, education cannot give him, any more than it is able, on the other hand, to annihilate entirely his original gifts, although it is true that his talents may be suppressed, distorted, and measurably destroyed" (65 : 47).

This principle is generally recognized by parents and teachers on the intellectual side, but is sometimes forgotten on the æsthetic, moral, and religious sides, where it no less holds. It is quite as impossible to make a saint out of a child with scant native endowment for moral appreciation as it is to make an intellectual genius out of a born idiot. But this is no argument or excuse for inferior pains or willful withholding of opportunity. The best results will still follow the best efforts. It is furthermore true that the capacities of no individual can be gauged absolutely beforehand. Powers may be present that neither the teacher nor the pupil himself suspects.

11. Twofold Function of School. Growing out of the limitation and specialization of mental powers, we get the selective function of education. In preparing the rising generation for the activities of life, education has a twofold function to perform; it must both instruct and select. It gives the needed equipment of knowledge and skill, and it also, often quite unconsciously, picks out those who are fitted to acquire and apply certain types of knowledge and skill.

The function of the school in imparting instruction and training is so well known that a lengthy discussion of it is unnecessary. While no school is without this function, it is especially evident in technical and professional schools. These schools exist for the manifest purpose of imparting knowledge and skill that are later to be directly applied in vocational activities.

The selective function of education is less generally recognized than that of instruction, but it is scarcely less significant. Says Thorndike: —

All environmental agencies, and especially our educational agencies, are a great system of means, not only of making men good and intelligent and efficient, but also of picking out those who for any reason are good and intelligent and efficient. In the latter case they may be said to improve not the production, but the distribution of mental and moral wealth. They help to put the right men in the right places. They help the individual somewhat in so far as they advertise his true make-up, and they help society in general tremendously by providing it, not with better men, but with the knowledge of which men are good. In estimating the value of any educational system this selective function should never be disregarded.

To have gone to school at all means not only that you have perhaps learned to read and write, but also that you were not an invalid, idiot, or runaway. To have progressed halfway through the graded schools means not only that you have learned somewhat, but also that you were not one of the ten or twenty per cent who by lack of means or ambition or health or mental ability have been eliminated from the school system. To have graduated from a high school means that you are one of a very small percentage of the group who entered school with you, a percentage picked for

survival not by chance, surely. And so on with the college and professional schools.

It is common to bewail the elimination of so many from school life and to rejoice at any numerical increase in the proportion of children at any age who are under school influences. These opinions are probably justifiable, but the more important cause for regret or satisfaction lies, not in the quantity of those who continue school work, but in their quality. Out of a thousand six-year-olds there are a score whose higher education is of more value to the community than that of a hundred of their fellows (74 : 94 f.).

The school serves the selective function in a variety of ways, which may all be classed as direct and indirect, or conscious and unconscious, but without any sharp dividing line between the two classes. It serves this function indirectly (1) by causing those students to drop from school who cannot meet its demands, and (2) by unconsciously leading the others in the direction of the natural bent of their capacities. The former will go to work in some non-technical vocation, not realizing perhaps that the school has had a part in their choice, while the latter will later find themselves in some more technical calling, but quite unconscious of ever having definitely chosen it. On the conscious side the selective function is discharged (1) when students definitely choose studies and vocations on the basis of their tastes and abilities as revealed by the school exercises, (2) when the teachers guide students in selecting studies, courses, and vocations on the basis of powers revealed in the classroom, and (3) when faculties fail to graduate students on the ground of mental or moral incapacity. To have taken the work of a professional school is not necessa-

rily a guarantee of later professional success. Society has a right, however, to expect the graduates of such schools to be reasonably successful because it is more or less at their mercy. This throws the responsibility of selection, no less than that of instruction, on the faculty, who owe it to society to exercise both equally.

The failure to recognize the selective function of education has led to no small amount of false theory and invalid argument, of which the following, clipped from a recent educational journal, is a sample: "A certain well-known college president has estimated that a college training increases a young man's possibilities of reaching the House of Representatives 352 times; of reaching the Senate 530 times; of reaching the presidency 139 times; of reaching the Supreme Court of the United States 2027 times; and after thus piling up statistics adds, 'Remember in general that a college education increases a young man's possibilities of reaching eminence and wealth and usefulness from 350 to 2000 fold.'" Now does it? Suppose there had been no colleges, would not these same men have been the ones to become eminent? We are dealing here with two variables instead of one.

12. Period of Infancy. In addition to a brain with its vast powers of acquiring and manipulating experiences, nature has evolved another condition that materially assists the educative process. This is the period of infancy. This period gives both time and plasticity for making the best use of the capacity for education just discussed.

In many of the lower forms of animal life the period of infancy is absent altogether. The amœba divides, the hydra buds, and the insect comes forth full

fledged from the pupa. In none of these creatures is the new-born member appreciably less helpless than the adult, or in any way dependent upon it. Its adjustments are taken care of by instincts which may be at their maximum efficiency from the beginning. But as we ascend the animal scale, a change is noticed. The young among vertebrates are not produced by division or budding, but are hatched from eggs or are brought forth alive, and they are dependent in varying degrees upon parental care and protection after birth. This period of dependence lengthens as we pass upward, and helplessness increases correspondingly. The calf and the colt can walk soon after birth, although dependent on the mother for nourishment and protection, but the baby orang-outang is as helpless as an infant for several months, and is cared for by its mother with a solicitude that is almost human. When we come to man the period lengthens still more and in a surprising degree. The infant seldom walks before the first year and often not until much later, verbal expression is still rudimentary at two years, schooling begins at five or six, legal majority comes at eighteen for the girl and at twenty-one for the boy, while many of those who enter careers of leadership through the path of the university remain under parental or social guidance till twenty-five and even longer. Why all this apparently wasteful delay?

The period of infancy has evolved as a definite biological result. It was selected in response to a complexity of adult activity and environment that could no longer be effectively accommodated by increasing complexity of instinct. It proved easier and more efficient to have the young born in an immature state, and to have them acquire after birth much that is needed for

adult life. In man, especially, the activities and environment of adulthood are so intricate that mere instinct would be too inflexible to meet the varied and delicate adjustments called for; neither could instinct alone have given rise to man's type of life which has proved so efficient in the struggle for existence. Moreover, the period of infancy is highly plastic compared with that of the adult, which makes the task of acquisition correspondingly easy. The conditions of education and training are thus provided for by nature.

13. Transmissibility of Acquired Traits. While the period of infancy makes education both possible and necessary, there is another biological fact that still further increases this necessity. This is the non-transmission of acquired traits. It is of course evident that knowledge as such is not transmitted directly from parents to offspring, but the problem that confronts us here strikes deeper than that. Are any of the modifications produced in the nervous system of the parents by education transmitted to offspring? Will John and Mary be inherently better scholars because their parents spent much of their time over books? Would they be inherently poorer scholars if these same parents had had no opportunity for study and had spent their lives in manual labor? Questions like these obviously cannot be answered off-hand; neither can they be answered by casual observation or an appeal to general principles. They need to be carefully investigated by expert scientists. This has been done, and while no final conclusion has as yet been reached, all the evidence so far adduced seems to point to the conclusion that such traits are not transmitted.

It seems to be a fact that all genuine biological pro-

gress occurs through the selection of fortunate congenital variations. Offspring not only resemble their parents, but they also differ from them, and whenever these differences or variations are of assistance in the struggle for existence, they are seized upon by nature and are perpetuated. Variations of this kind are not caused by anything that the individual has done to himself, or that has been done to him, but they are brought about by causes inherent in the race and are for that reason called "congenital." Acquired traits, which are changes that the individual has produced in his body or mind by his own efforts, or that have been produced in him before birth, are apparently not transmitted to his offspring. But even if they are in a measure transmitted, this transmission certainly takes place in so small a degree that education can neglect it without vitiating its conclusions.

It is not in place here to go into the pros and cons of this matter, but the following summary by Thorndike may be helpful in understanding it: —

Whether we are by nature what our parents were by nature alone, or what they were by nature plus training, may be argued from two points of view. The probability of the latter event may be estimated from our knowledge of the physical relations between parents and offspring, or its actual occurrence may be determined from evidence.

Some matters are fairly sure:

1. Whatever changes occur in the nature of the chromatic substance in the nuclei of the germs and ova of the parents will influence the original nature of the offspring, for the nuclei of the germ and ovum *are* the original nature of the offspring. And nothing else will.

2. The germs and ova are made directly from the

germ plasm (ovaries and testes) of the parents, and not from their bodies in general. Just as the bone marrow makes blood, or the cells of the neural tube the nervous system, so the germ plasm makes the germs and ova.

3. The cells which are specialized to form the germ plasm, that is, to do the work of producing the next generation, are set off and begin their more or less separate careers long before the individual is born.

4. The line of inheritance is thus from germs to germ plasm to germs to germ plasm and so on.

5. The germ plasm is connected with and related to other structures in the body, including those of the central nervous system, in no more intimate way than are the other structures amongst themselves. The nervous system influences the growing germ or ovum as it may influence the cells of the liver or heart or skin.

6. No known mechanism exists by which such alterations of the nervous structure, or of the quality of the nervous tissue as would correspond to changes in human mental traits, might produce in the germs changes fitted themselves to become in the adult form similar structures or qualities to those which caused them.

7. The acquisition of specific mental traits by an individual seems thus unlikely to modify his germs so as to reproduce the trait acquired. With very general traits, such as mental vigor or weakness, health or degeneracy, the case might well be different. Such general mental traits might be correlated with bodily conditions which would include the germ plasm as well as any other parts of the body. The correlation is, however, by no means perfect. As a precise measure of how far acquired conditions of general health involve changes in the germ plasm, and of how far such changes influence mental qualities in the offspring, there are none.

The obvious way to settle our question is not by contemplating these inferences from present knowledge of

processes of development, but rather by making the crucial experiment of letting animals acquire some mental traits, and observing the nature of the offspring. No such experiments of a decisive nature have been made (74: 62 f.).

Even if it is finally proved that acquired traits are not at all transmitted, the teacher need not despair. Here, as in other instances, the limitation of nature proves to be the opportunity for education, for it alone can remedy the apparent defect. The non-transmission of acquired traits through the germ plasm closes only one channel for such transmission. The channel of education and training is left as wide open as it ever was, and for the transmission of the complex elements of man's life this channel is no doubt better than the other. It places the external means of progress within man's own control, and our science, literature, and art; in short, our present civilization in all its tangible aspects is the index of its efficiency. The finest achievements of the past, no matter when made or where, are still at our disposal. Knowledge is the most potent of all acquired traits, and it is man's prerogative to transmit this to his offspring.

14. Eugenics. It may be that the advancement of civilization since the dawn of history, and even before, has been due entirely to improved environment, using this term in a sense broad enough to include all theoretical knowledge, but this is not necessarily the only means of improvement open to the race. There is no reason to think that the avenue of improvement through congenital variation and selection is closed to man. This factor may indeed still be operating in mankind, but so slowly as to be imperceptible. But man could take hold

of it and operate it to his own advantage if he chose to do so. He does utilize it with marked success in the realm of plants and domestic animals. Witness the all but miraculous achievements of Luther Burbank. He does not create, but, assisting cross-fertilization to hasten variation, he selects what nature really produces. Our fine breeds of domestic stock of all kinds are the result of similar selection.

Now the laws of hereditary transmission hold with man no less than with the rest of life, and scientific men have long known it. But to make conscious applications of these laws to man is a delicate and all but impossible task. It would have to be done in some way through marriage, and this is a field in which feeling rules, rather than intellect, and in which no one brooks interference. The right to marry and rear a family is regarded by society as sacred to all save those who are mentally unsound. Physical infirmity and disease are but imperfectly excepted, and the same is true of moral worthlessness and depravity, although sentiment is changing in these respects. This is no doubt well, but it certainly increases the difficulty of the problem. Instruction in the laws of heredity, and their bearing on the choice of a partner for life, may do something. A little more may perhaps be done by legislation and by rewards to encourage marriage and the rearing of families in certain social strata, and to discourage marriage in all those that are socially dependent for support. This is done to some extent in Germany. But having accomplished this much, other difficulties stare us in the face. One of these is the relative infertility of the more individuated stocks. College teachers, artists, and other selected classes are usually either childless or have but small families.

Weaknesses in directions other than the reproductive also crop out when we select too closely.

In concluding his discussion of this topic, J. Arthur Thomson says: —

> Our general position is that among civilized men the sentiments of solidarity and sympathy are too precious and too strong to admit of *much* social surgery, or of the more thoroughgoing methods of reproductive elimination, which moreover assume the possession of more science than is really available. On the other hand, there seems much to be said for restricting the reproduction of undesirables who fall back on the State for support, for some sort of marriage tests, for developing a social prejudice against reproduction among the victims of markedly bad inheritance, for a fuller and deeper recognition of woman's rights both as to mating and maternity, for eugenic devices such as Mr. Galton has suggested, and so on (73 : 532 f.).

The term "Eugenics" has been suggested by Francis Galton, and refers to the method of race improvement through the agency of selection based on congenital variation.

15. Summary: Biologically, man belongs to the animal kingdom and is subject to the laws that pertain to that kingdom. Variation and selection, however, have differentiated him from the other creatures, and have made education both possible and necessary. The possibility of education is furnished by the presence of reflective intelligence and the early plasticity of the nervous system. Education is made necessary by the period of infantile helplessness and lack of power of instinctive adaptation to the situations of adult life, and by the non-transmissibility of acquired traits. But

while social progress is now almost, if not quite, conditioned by improved environment, which is conserved and added to, progress through congenital variation and selection might apparently also be utilized by man as he himself uses it with plants and the lower animals. Education is limited by the variable strength of native capacity, which also introduces the selective agency of education.

EXERCISES

1. Do any of the lower animals educate or train their young?

2. What bearing would the transmission of acquired traits have upon education?

3. What are the neurological changes produced in the brain by education?

4. What evidence is there that man has descended from lower animal forms?

5. What evidence is there that mental traits, like physical traits, are inherited? (73 : 525); (74 : 52 f.).

6. Distinguish between the *fact* and the *method* of evolution. Which is at present most discussed and investigated?

7. Do evolutionists believe that man has descended from the ape? What is a "common ancestor"? A "connecting link"?

8. Distinguish between a congenital and an acquired trait. If acquired traits are not transmitted, how does evolution proceed?

9. What is the doctrine of evolution, and on what evidence does it rest? What has Hugo de Vries added to Darwin's theory of natural selection?

10. Would it be consistent to believe that, while evolution applies to the plants and to the lower animals, it does not apply to man? Give reason for your answer.

11. May there be an inherent tendency in human germs (and in other germs as well) to vary in a definite direction,

so that racial improvement would take place without the element of natural selection? Compare and contrast this idea with the growth of an acorn into a tree.

12. Is the following argument valid? "The congenitally blind from eye defects do not have visual images of the sun, stars, or any other of the permanent objects of the natural world, yet their ancestors for at least hundreds of generations, save in the cases of those lacking in visual images, had such images, again and again. If the hourly experiences of hundreds of ancestral generations do not become a part of inborn equipment, we could hardly expect anything to do so" (74: 65).

COLLATERAL READING

BAGLEY, Educative Process, 1–22.
BUTLER, Meaning of Education, 3–17.
DEWAR and FINN, The Making of Species.
FISKE, Meaning of Infancy.
HORNE, Philosophy of Education, 18–56.
THORNDIKE, Educational Psychology, 62–65, 94–96.

CHAPTER III

THE AIM OF EDUCATION

16. The Aim Stated. The aim of education has been implied throughout the preceding chapter. It may be defined from the biological standpoint as the adjustment of the individual to the life in which he must participate. The word "environment" might be substituted for the word "life," but not without making the two words synonymous, which seems unwarranted. In ordinary usage, "environment" is taken to have objective reference only, but this is inadequate for education, which deals with subjective matters as well. The word "life," as ordinarily used, includes these, but without at the same time excluding the objective aspects with which education also deals. Education adjusts to environment, but it does more than that; it adjusts to life both in its objective and subjective aspects.

In the process of adjustment education is not the only factor, for much is taken care of by instinct, but it is nevertheless an indispensable factor. By means of it man is especially adjusted to those elements of life that are characteristically human, — those elements that man alone possesses in any conspicuous degree. These are, briefly, the humanities, the natural sciences, and philosophy, on the one hand, and a cultivated and disciplined mind and refined conduct, on the other. The first of these, which imply instruction, may be described as objective or contentful, and the second, which imply

training, as subjective or formal. These two classes of elements are obviously correlative, one implying the other; but they should both be explicitly stated in any complete definition of education, a fact that will become more and more evident as we proceed. Including them both, we may now say that *to educate a person means to adjust him to those elements of his environment that are of concern in modern life, and to develop, organize, and train his powers so that he may make efficient and proper use of them.* The first part of this definition refers to the objective, and the second to the subjective, side of life. The two are intentionally given in the order mentioned. Broadly considered, the objective or content side of life is primary, and the subjective or formal side is secondary. Powers cannot be developed and trained except in reference to definite objective or contentful requirements. It is necessary to specify *modern* life because it must always be distinctly realized that the function of education is not to adapt to the past, but to adapt the achievements of the past to the present; and the word "proper" is necessary to insure the inclusion of the ethical aspect of life.

This definition in ultimate essence means nothing more than to say that education is the means of equipping the individual to live a typical *human* life, and that in final analysis this life contains both objective and subjective aspects. A more detailed account of what a typical human life should contain belongs to the domain of the moralist rather than to that of the educator. Paulsen, in giving such an account, speaks as follows: —

We may say in a most general way that the good at which the will of every living creature aims is *the normal exercise of the vital functions which constitute its na-*

ture. Every animal desires to live the life for which it is predisposed. Its natural disposition manifests itself in impulses, and determines its activity. The formula may also be applied to man. He desires to live a *human* life and all that is implied in it; that is, a *mental, historical life, in which there is room for the exercise of all human mental powers and virtues.* He desires to play and to learn, to work and to acquire wealth, to possess and to enjoy, to form and to create; he desires to love and to admire, to obey and to rule, to fight and to win, to make poetry and to dream, to think and to investigate. And he desires to do all these things in their natural order of development, as life provides them. He desires to experience the relations of the child to his parents, of the pupil to his teacher, of the apprentice to the master; and his will, for the time being, finds the highest satisfaction in such a life. He desires to live as a brother among brothers, as a friend among friends, as a companion among companions, as a citizen among citizens, and also to prove himself an enemy against enemies. Finally, he desires to experience what the lover, husband, and father experience, — he desires to rear and educate children who shall preserve and transmit the contents of his own life. And after he has lived such a life and has acquitted himself like an honest man, he has realized his desires; his life is complete; contentedly he awaits the end, and his last wish is to be gathered peacefully to his fathers (60: 270).

The conception of education as adjustment is conspicuously biological in its essence. It is a result of the spreading leaven of the doctrine of evolution, and is only now in the process of becoming dominant. It is the logical sequent of the conception that the earth has been man's natural home for eons of time, and that man has come to his present estate by an adaptive and upward

struggle with his surroundings; a struggle that has, indeed, often been hard and trying, but that has never lacked in interest and the zest of life. Understanding this relation, man no longer tries to abjure the world, to seek seclusion from it, or to gain liberation from a life of bondage; but he seeks to understand and master the world, and to make it an ever increasingly pleasant place in which to live.

17. Adjustment the Keynote of Life. Adjustment, or adaptation, is the keynote of life throughout the plant and animal kingdoms. One sees it so constantly manifested on every hand that the enumeration of instances seems superfluous. Protective coloration forms an excellent example. The polar bear is white like the ice and snow in which he lives, the jack rabbit of the temperate zone is gray in summer and white in winter, and the zebra is striped to resemble the appearance of the tall grass of his habitat. Many a person has taken the bug called "Walking-stick" for a twig, only to be horrified at having it move in his hand. The camel has broad hoofs to enable him to walk over loose sand, he has a water pouch to protect him against thirst in desert regions; and so on through the list.

What is true of the body as a whole is true also of all its parts. With the exception of certain vestigial organs, every organ is fashioned to perform a function that is ultimately demanded by the conditions of life. The nervous system is no exception to this rule, but forms one of the most excellent illustrations. It allows a rapidity and delicacy of adjustment that would be quite impossible without it. We come here, indeed, to the adaptive agency of mind, for mental action is the supreme function of the nervous system. Every instinct active in the

animal world has survived because it has enabled its possessor better to survive and to fit into his niche in life. The fact that an instinct like curiosity will occasionally lead an animal to its death is no real exception to the rule. On the whole, curiosity assists in survival even among the lower animals, and its possibilities are indicated by the splendor of the mind of man.

18. Human and Animal Life Contrasted. In the lower animals life is practically synonymous with adaptation to environment. These animals are guided in the main by instinct, and in consequence they have but little mental life of which they are distinctly aware. The environment, moreover, to which they are adapted by their various organs and instincts is much as nature has directly provided it. It is, of course, complicated by the presence of other animals, which both prey and are preyed upon, but these also are the direct product of evolution. The fox, indeed, digs his burrow, and the beaver builds his lodge, to that extent making their own environments; but these acts are done instinctively, with little or no intelligent guidance, and they do not greatly complicate the environment as directly provided.

But when we come to man, the case changes greatly. He lives largely in the realm of mind, and his environment is no longer natural, but artificial; it is "man-made." The points untouched by his modifying hand are the exception instead of the rule. Man no longer adapts himself to nature as he finds it, but adapts nature to his own needs. The forces of progressive adjustment have been transferred from without to within.

19. Characteristics of Man's Life: (a) Re-created Environment. This fact is again so universally manifest that illustrations seem superfluous. Our funda-

mental needs — protection, food, clothing, shelter, locomotion, and communication — all equally illustrate it. Man no longer lives in caves formed by the elements, but provides himself with comfortable dwellings that are warmed or cooled in various ingenious ways. The rigors of climate are overcome by both fire and clothing. The materials of clothing are so transformed that their source is seldom directly manifest. Some articles of food are eaten in their natural state, but most of them are so changed in their preparation for the table that they are quite unrecognizable. Neither is nature left to produce foods and fibers in its own manner and places, but animals are raised, the soil is cultivated, and deserts are made to blossom by irrigation. A Burbank comes along and outdoes nature in the production of new varieties of fruits and vegetables. Physically weak, and with neither horns, claws, nor fangs, man, with the aid of the rifle, has the advantage in an encounter with the strongest and fiercest of the beasts. Language is a product of evolution, but the efficiency of the natural power of communication is multiplied many fold by the telephone, telegraph, and wireless. Restricted by nature to a comparatively slow rate of locomotion, man first hollowed trunks of trees and harnessed animals to assist him. Later he utilized the forces of nature, until now he is one of the most mobile of the animals. Even the air seems finally to have been conquered as a medium of travel.

19. (b) Mental and Spiritual Life. But this is not all. It is only the foundation for human life as it really is. We were taught in our childhood that man does not live to eat, but eats to live, and this is essentially true. Food, clothing, shelter, locomotion, and the rest, are

not the ends of life, but only the means, in large part at least. To the extent that their prosecution is pleasant and interesting, they are life, and it may even be maintained that their prosecution is, or should be, pleasant and interesting throughout, but there are yet activities beyond for which we all ultimately strive. These are the intellectual, the æsthetic, the social, and the religious. Not that these are entirely divorced from our vocational activities, for all our activities are more or less interrelated, but they nevertheless form elements of superior excellence for which we aim quite independently. While we can no longer go the full distance that Aristotle went, and say that all work is for the sake of leisure, we cannot fail to maintain that life without leisure nobly spent is less than human. The intellectual and emotional activities are the most cherished and characteristic activities of human life. Not mere shelter, but a beautiful home; not mere clothing, but æsthetic attire; not mere production, but joyful work, are our aims. The scientist, the artist, the true business man, and the true professional man work for the activity quite as much as for the product. Science is appreciated for the insight it gives no less than for its usefulness, and the column is desired more for its beauty than for the support it yields. Literature, art, and travel are, indeed, recreative, and so make for more efficient future action, but we want them mainly for the life they yield directly. Religion is a solace in this world as well as a hope for the next. Parties, receptions, and social intercourse in general, are among the most delightful experiences we have, and are much more than mere incidents in life. The heart of man's life is not the vegetative and the physical, but the realm of the intellect and the feel-

ings, and to this only education can adequately adjust him.

19. (c) Moral Life. Another element of man's life that is primarily a means, but that is in a measure also an end, is the moral or ethical. This holds such a conspicuous place in human life that no educational theory aspiring to completeness in the essentials can afford to leave it out of account. It is the condition that makes possible the pursuit of one's calling and the undisturbed enjoyment of one's leisure. One may, indeed, call it the corner-stone on which society and civilization rest. Without it, social life as we know it could not exist. Were it removed for but a day, we should revert to a condition worse than savagery, and even now much of the evil and suffering in the world is the direct result of its neglect.

On the objective side the moral life is a result of the inherent social nature of man which impels him to live in groups, while on the subjective side it is made possible by man's developed intellect and by the feeling impulses of sympathy and of fairness. The gregarious life of man has been the condition for the development of the moral life, but without the spontaneous appearance of the impulses mentioned, and of insight, this life could not have been selected. These subjective qualities were chosen because they proved to be valuable to the organism; because life on a social basis, which they made possible, is more effective than life on an individual basis.

Granted the power of intellectual insight, the characteristic tone of the moral consciousness is produced by the feelings of sympathy and of fairness. Other feelings may also be present, but they cannot be called char-

acteristically moral. Fairness is the root that gives us integrity, loyalty to principle, and the sense of right and justice, while sympathy is the mainspring of kindness, generosity, altruism, and self-sacrifice. One prompts to righteousness and the other to neighborliness. Both are essential, and it is idle to place one above the other. Mercy without justice is debilitating, and justice without mercy is cruelty. Education must awaken and train them both, and it must enlighten the intellect on moral topics certainly no less than on others.

19. (d) **Man's Life Progressive.** Education cannot rest content with adjusting the rising generation to the life as it is found at the moment. Man's life and environment are not static, but dynamic and progressive, and education must take this into account. The world is ever moving on, and as time proceeds, it appears to be moving ever more rapidly. One generation now probably witnesses more advancement than did five generations a few centuries ago. This has a telling effect on mankind. On the whole, it improves the conditions of life and happiness, but not infrequently men, by individuals and by groups, are thrown out of adjustment and are left stranded like so much superannuated machinery. Their callings or their methods of pursuing them are superseded by more recent inventions or by more economical combinations of industry. Still others, who may retain their callings, but who do not keep abreast of progress, are left hopelessly in the rear. If they are business or professional men, their business slips away from them, and goes to those who are younger or more progressive. As a result, they lose both their support and peace of mind. They speak of "the good old times," and are sure that the world is growing worse

and is going pellmell to perdition. Their millennium, instead of being in the future, is in the past.

20. Causes of Arrested Adjustment. The causes of the inability of the individual to continue growing with his environment are various and complex. At least three may be mentioned. These are the lack of knowledge, the principle of habit, and the declining plasticity of the nerve tissue as maturity advances. Their importance probably ranks in the order in which they have been given. The tendency for the plasticity of nerve tissue to decline varies in different people, and so far as we know, it cannot be checked except by death, one of whose functions appears to be to remove the old and static in order to make room for the young and plastic. But its dampening influence on progressive adjustment may no doubt be much mitigated by the proper sort of knowledge. Habit pervades all of man's activities, throwing them into a fixed and static form, and unless influence is brought to bear from "above" in some way, progress is comparatively stopped. The influence that may be brought to bear is again knowledge, knowledge rightly acquired and of the right sort, and this is obviously also the remedy in regard to ignorance. It is here that the educative process must bring to bear its leverage, which it can do in at least three ways.

21. Remedies: (a) Realization of Progress. In the first place, the student must be led to *realize* that this is a progressive world, and that he will be left behind unless he makes continual efforts to keep abreast. The chief trouble with those who are left stranded usually is that they look to others, and not to themselves, for the cause. They feel sure that they learned the thing in their youth, and that the world is unkind and fickle

for not staying by them. Their theoretical training is, no doubt, also at fault, but if they were keenly conscious of the fact that nothing is final and everything is in a state of flux, they could probably remedy this. It is the judgment factor, and that only, that enables one to escape from the bondage of habit. Habit is good in its place; it saves much time and energy, but in certain realms we must ever keep a watchful eye upon it and be ready to modify our reactions as occasions require. The structure of the educated mind should be like that of some modern buildings, never finished, but at all times ready to be extended in any and all directions. This is the *aim* or *ideal* factor in adjustment to progress.

21. (b) Apperceptive Basis. In the second place, psychological experiment is demonstrating that a person's plasticity in any line of activity varies with the amount of theoretical knowledge he has upon which to base that activity. Judd records a suggestive experiment touching this point. He says: —

Two groups of pupils in the fifth and sixth grades were required to hit with a small dart a target which was placed under water. The difficulty of hitting the target arises, of course, from the deflection which the light suffers through refraction. The target is not where it seems to be, and the boy must fit his aim with the dart to conditions which differ from those which he knows in ordinary life. The amount of refraction and the consequent displacement of the target are capable of definite theoretical explanation before one throws the dart. In this experiment one group of boys was given a full theoretical explanation of refraction. The other group of boys was left to work out experience without theoretical training. These two groups began practice with the target under twelve inches of water. It is a

very striking fact that in the first series of trials the boys who knew the theory of refraction, and those who did not, gave about the same results. That is, theory seemed to be of no value in the first tests. All the boys had to learn how to use the dart, and theory proved to be no substitute for practice. At this point the conditions were changed. The twelve inches of water were reduced to four. The difference between the two groups of boys now came out very strikingly. The boys without theory were very much confused. The practice gained with twelve inches of water did not help them with four inches. Their errors were large and persistent. On the other hand, the boys who had the theory fitted themselves to four inches very rapidly. Their theory evidently helped them to see the reason why they must not apply the twelve-inch habit to four inches of water. Note that theory was not of value until it was backed by practice, but when practice and theory were both present, the best adjustment was rapidly worked out (24: 36 f.).

The person who understands the theory underlying a line of activity can see the reasons for modifications and advances, and, having a basis for their assimilation, can adjust himself accordingly. We are here face to face with the principle of apperception as applied to progressive adjustment. Medicine is at this time making rapid advances along the lines of bacteriology and pathology, and the physician who is well grounded in these sciences can readily assimilate the advances that are made, while the one who is not so grounded stands helpless and perplexed. For him the old blind routine must suffice, and his declining practice is the consequence. The teacher who is not well grounded in theory is equally helpless. He must have intelligent plasticity both in his academic and in his professional equipment.

Unless he knows the fundamental bases of aims and of methods, he is at the mercy of every fad that comes, and he cannot unaided sift the chaff from the wheat. The content of what he teaches is also ever changing, especially in the sciences, which calls for continuous diligence in progressive study.

The bearing of this on education is obvious and far-reaching. It speaks for sound theoretical training; not necessarily apart from practical training, but theoretical training, nevertheless. The mere doing of a thing is not sufficient; in order to be placed under progressive control, it must be systematically understood. We have here the *apperceptive basis* for progressive adjustment.

21. (c) Dynamic Method. The third factor that brings about plasticity concerns the element of method in acquisition. The progressive nature of the environment requires the elimination of dogmatism from teaching on nearly all sides. Facts and principles should be taught as more or less tentative, as representing the state of knowledge now existent. The student should frequently be given glimpses into the historical development of knowledge, which will help him to appreciate that, just as changes have occurred in the past, so they are likely to occur in the future. Further, adaptation to environment is throughout an active process and not a receptive one. A person cannot become adapted by passively receiving something, but only through active participation. This implies that the pupil's part in the process of learning should be dynamic. He should be led to find out things for himself, to question critically, in short, to use his own judgment and initiative, to the end that he may establish within himself progressive methods of work.

This implies further that the method of education should be largely direct. A student should come into active relation with things and situations themselves, but this should be accompanied by the study of facts and theory as recorded in books. Active management and control are usually accomplished most efficiently when approached from the thought side. Theory and practice go hand in hand, and really cannot be separated, not even in the actual process of adaptation. This makes the study of books in the schoolroom necessary, now as always, but concrete activities are no less necessary. The mischief arises when the two are divorced. In the past the study of books has usually held too large a place, but the pendulum is now swinging in the other direction. In most subjects, however, it is not likely to swing too far. Because of the ease of managing books in school and the difficulty of managing things, it is more likely not to swing far enough.

It is, of course, not meant that every one should become an original investigator and discoverer. Those activities belong to the few who are by nature fitted for them. Still, this class would no doubt also be benefited by the principles here indicated, for more would be led into it through self-discovery. What is meant primarily is that the rank and file of people should be assisted to a position where they may appropriate what the leaders in all lines originate, and where they may give their moral support and, if possible, their coöperation. There is little danger that progress will ever go on too fast, and a part of the maladjustment that it now entails could no doubt be mitigated through proper education.

22. **Progress and the Curriculum.** The progressive

nature of man's life has a vital bearing also on the content of the curriculum. The curriculum represents man's present life in epitome, and as this life changes, the curriculum should change. This it should do as regards both inclusion and exclusion. Knowledge no longer used in life should no longer be retained in school, except as history, while new knowledge that is used should be taken up and included. As is so frequently the case, this is simple in theory, but proves to be difficult in practice. There is always a fight when topics so far taught are to be excluded, and there is no less opposition when new ones are to be included. Because of this the statement is sometimes made, and with some justice, that the school is always a generation behind civilization. As a cause of this opposition is cited the conservatism of human nature, but deeper the analysis seldom goes. There are no doubt several causes, such as the lack of teachers for the new, lack of proper school facilities, reverence for the training we have ourselves received, and the extreme demands of the faddists, but as one cause we have here, no doubt, just the phenomenon we have been discussing. Beyond question, much of the conservatism we meet is a direct result of the fact that education is not taking a sufficient account of the progressive element in man's life. Those who produce the opposition are neither fully aware that this is a moving world, the school included, nor do they understand the principles underlying the curriculum. They have neither the ideal nor the theoretical bases that enable progress.

23. Meaning of Adjustment. Adjustment in education means fundamentally three things. It means intelligent *mastery* over one's environment, increased

harmony with it, and added *appreciation* of it. The adjusted or educated person feels at home in the world, he has at least a part of it under his intelligent control, and he has opened up to him new avenues of intellectual and emotional enjoyment. The plants and flowers are his acquaintances, with whom he does not work at cross purposes. His knowledge of them gives added richness to his life in the fields and the woods, and if he chooses to apply this knowledge to horticulture or agriculture, it will yield him financial returns. Bacteriology, physiology, and hygiene not only enable him to live in harmony with the rules of health, but they give the physician control over the results of transgressions. The person who knows the stars and the planets, who understands their movements, and who is acquainted with the constellations and the myths connected with them, has a source of delight that it would be hard to overvalue, and the appearances of comets and eclipses are to him phenomena that are to be awaited with interest, and not to be feared with a sinister apprehension. The telephone, the telegraph, the telescope, the Crookes tube, and the steam engine are mysteries to the child and to the untutored, but to the student of physics their secrets are revealed. He appreciates their mechanism, knows what he may touch and what leave alone, and the specialist lets them do man's work. What is true of the sciences is correspondingly true of history, language, literature, and the rest of man's social-historical environment. The educated man is one whose life is characterized by increasing richness, safety, and control. He has been stimulated on all sides, in feeling no less than in intellect, and his skill in application has been developed by practice.

24. Summary. This, in brief outline, is the life to which man must become adjusted. It is characteristically progressive, and is in a measure solely mental. Where it does touch the physical, adjustment is still accomplished through the mental, *i. e.*, through knowledge. The callings of medicine, law, teaching, preaching, farming, and engineering, no less than science, literature, history, art, and religion, are entered and controlled largely through the avenue of mind. A type of adjustment is here demanded for which nature has given the equipment only in capacity. Man himself must fill in the content, which he does through the school and other agencies.

The aim of education may be defined as the adjustment of the individual to the life in which he must participate, this life being considered both in its objective and subjective aspects. The environment of man is largely artificial, the product of his own achievements, thus differing widely from that of the lower animals, which is much as nature has directly provided it. Man is no longer directly dependent on nature for protection, food, clothing, shelter, locomotion, and communication, but he provides these items by controlling the forces of nature through knowledge. The most characteristic features of man's life, however, are the intellectual, the æsthetic, the social, the moral, and the religious. All these features demand a corresponding type of educative process. This process is complicated by the fact that man's life is not static, but dynamic and progressive. This dynamic and progressive aspect is produced by the leaders of mankind themselves, and all others must become adjusted to it. This may be done through proper methods of teaching, through the comprehension of

fundamental principles, and through the awareness of the fact that the world is changing and progressive, and that we are likely to fall behind unless we make definite efforts to keep abreast. The progressive nature of life also has a vital bearing on the content of the curriculum.

EXERCISES

1. Does one ever have thoughts and feelings that have no reference to adjustment?

2. Point out some conflicts in the school curriculum that are owing to changed environment.

3. Show that one's view of the nature and function of mind will affect one's view of education.

4. Show that adjustment has been the unconscious, if not the conscious, aim of education throughout history.

5. According to ethics, what is the *summum bonum*, or Highest Good? What relation has this to the aim of education?

6. Discuss the following definition: "Environment includes the inherited and acquired characteristics of one's own mind and body, as well as the physical surroundings of outer life."

7. Mention instances from various lines of activity in which individuals or classes were injured because of progress. Could any of these have been mitigated by previous school education?

8. In defining the aim of education as adjustment, is it necessary to specify the subjective aspect, as was done in the text, or would this be implied by the word "adjustment"?

9. Show that the exercise of the moral life is an end as well as a means. What is meant by saying that virtue is its own reward, and that the reward of doing good is having done it?

COLLATERAL READING

Boone, Science of Education, 271–396.
Judd, Genetic Psychology for Teachers, 129–160.
Münsterberg, Psychology and the Teacher, 47–77.
O'Shea, Education as Adjustment, 76–117.
Swift, Mind in the Making, 307–329.
Vincent, Social Mind and Education, 91–113.

CHAPTER IV

OTHER STATEMENTS OF THE AIM OF EDUCATION

(A) *Content Aims*

25. Prevalence of Adjustment Aim. The statement of the aim of education as "adjustment" has been used occasionally in educational literature for some time. Nicholas Murray Butler, speaking in 1896, said: "If education cannot be identified with mere instruction, what is it? What does the term mean? I answer, it must mean a gradual adjustment to the spiritual possessions of the race" (11 : 17). Horne, writing in 1903, defined education as "the eternal process of superior adjustment of the physically and mentally developed, free, conscious, human being to God, as manifested in the intellectual, emotional, and volitional environment of man" (36 : 285). Judd, in his "Genetic Psychology for Teachers," takes precisely the same view as is taken in this text. (See, for example, chapter v.) He continually uses such expressions as "adaptation to environment" and "the doctrine," or "the principle, of adaptation." But it has remained for O'Shea to work out in detail the conception of adjustment, as applied to education, and make it current. He did this for the public in general in his "Education as Adjustment," published in 1903, but he gave the material in lecture form to his classes for several years before that time.

While the definition of education as adjustment to

life is very general, as a brief definition of so large a subject as education necessarily must be, it nevertheless includes just the essential points. It is broad enough to embrace all stages and varieties of education, and views the subject from the scientific standpoint, which is one of the strongest things in its favor. This standpoint is impartial and disinterested, favoring nothing except careful scientific inference. It removes education from the realm of philosophical and theological opinion and other partial views, and places it on the same dignified footing as medicine and engineering and all other callings based on the sciences. What is true in the partial statements is naturally included in this one, for it embraces education in all its phases.

But while this conception of the aim of education is now probably more prevalent than any other, and bids fair to become a commonplace, there are other conceptions that are still living, or that have died so recently that in deference to them we must digress slightly from our main line of exposition at this point and consider them. This will not only give us a knowledge of them, which it is necessary for the broad student of educational theory to possess, but it will also throw additional light on our own point of view, and so will help us to see what the essential qualities of an acceptable aim are. In presenting these aims it will be expedient to quote frequently from the writings of their sponsors.

26. The Social Aim. The aim deserving to be considered first in this connection is, perhaps, that of "social efficiency," more frequently called merely the "social aim." This formulation has been given wide currency by the writings of Dewey and of Bagley. Dewey nowhere gives an explicit exposition of the aim, but the social

aim is the one overtly adopted in all his educational writings (cf. 16, 18). He begins his "Creed" with this sentence: "I believe that all education proceeds by the participation of the individual in the social consciousness of the race." The "ultimate and unified standard" for the value of studies, he takes to be "the extent and way in which a study brings a pupil to consciousness of his social environment, and confers upon him the ability to interpret his own powers from the standpoint of their possibility in social use" (16 : 18). It is worth noting that this wording explicitly includes both the objective and subjective aspects brought out in the preceding chapter.

The term "social efficiency" is the one preferred by Bagley, who develops it as follows: —

> Social efficiency . . . is the standard by which the forces of education must select the experiences that are to be impressed upon the individual. Every subject of instruction, every item of knowledge, every form of reaction, every detail of habit must be measured by this yardstick. Not, what pleasure will this bring to the individual? not, in what manner will this contribute to his harmonious development? not, what effect will this have upon his bread-winning capacity? but always, will this subject, or this knowledge, or this reaction, or this habit so function in his after-life that society will maximally profit?
>
> It now remains to state as clearly and explicitly as possible just what social efficiency means.
>
> (1) That person only is socially efficient who is not a drag upon society; who, in other words, can "pull his own weight" either directly as a productive agent or indirectly by guiding, inspiring, or educating others to productive effort.

(2) That man only is socially efficient who, in addition to "pulling his weight," interferes as little as possible with the efforts of others.

This requires of a socially efficient individual that he be moral in at least a negative fashion; that he respect the rights of others, sacrificing his own pleasure when this interferes with the productive efforts of others.

(3) That man is socially most efficient who not only fulfills these two requirements, but also lends his energy consciously and persistently to that further differentiation and integration of social forces which is everywhere synonymous with progress (4 : 60 f.).

Now it is no doubt evident to the impartial student that by the "social" or "social efficiency" aim, Dewey and Bagley mean essentially the same thing as others do by the aim of adjustment. The difference is one more of words than of substance. A curriculum selected by Bagley with his "yardstick" might be quite identical with one selected by O'Shea with his. Still, this does not imply that these formulations are of equal merit. Certain desirable subjects, such as art and music, that the adjustment aim would include directly, the social aim would include only indirectly. Strictly interpreted, the social aim is but a partial statement of the aim of education, the truth of which is included in "adjustment to life." "Life" is a broader term than "social" and includes it, just as human life is broader than social life, including the latter. Man comes in contact with the inanimate, the plant, and the animal worlds as well as with the social, and these contacts are not always for the sake of the social. They may be primarily for the individual's own gratification. In actual life the individual is not subordinated to society to the extent that is implied by Bagley. Man indulges his taste in music,

art, literature, philosophy, and even science, largely for his own immediate enjoyment, without any thought of social benefit, and it is conceivable that such benefit might not ensue.

A broad view of the history of civilization indicates an unmistakable development toward the appreciation of the unique worth of the individual. In primitive society the unit is always the group, the individual receiving scarcely any separate recognition, but as civilization advances and life grows more secure, the individual becomes more and more prominent. Social life continues, of course, and is cherished more rather than less, but the conception of the individual's place in society becomes vastly more liberal. It is seen that from the human point of view society exists for the individual, and not the individual for society, for it is the individual that really lives and experiences, and not the group. Social organization is but a means for the full realization of individual lives. This means is even instinctively demanded, so that man really cannot get away from it. It is as natural for man to live and coöperate with his fellows as it is for him to eat and to drink, to enjoy and to create, and quite as necessary. The social form of life has been selected for man because of its efficiency, and now represents one of his most fundamental needs; but man has other needs as well which are no less fundamental. Man's life, and consequently education, are not bounded by the social, and the social criterion is not the only one for admitting subjects to the curriculum. It is but one among several, albeit a very important one.[1] Its importance is commensurate with the position that the social element holds in man's life, but an ade-

[1] Cf. chapters vii and viii.

quate conception of the function of education must be broad enough to include other elements as well.

27. The Moral Aim. The social aim is the development of the *moral aim of education*, which has been dominant since the time of Herbart (1776–1841). This aim is thus defined by Herbart: —

The term *virtue* expresses the whole purpose of education. Virtue is the idea of inner freedom which has developed into an abiding actuality in an individual. Whence, as inner freedom is a relation between insight and volition, a double task is at once set before the teacher. It becomes his business to make actual each of these factors separately, in order that later a permanent relationship may result.

But even here at the outset we need to bear in mind the identity of morality with the effort put forth to realize the permanent actuality of the harmony between insight and volition (45 : 7).

This aim has been elaborated and given wide and effective currency by the disciples of Herbart. Charles A. McMurry, one of these disciples, accepts "the moral, character-building aim as the central one in education," and summarizes its leading characteristics and merits as follows: —

1. The attainment of moral excellence in conduct is the perfection of the individual.

2. Ability to fulfill the moral law in the social relations is the chief demand that society makes upon the individual.

3. Moral enlightenment and growth toward moral conduct are subject to the same laws as other forms of mental culture.

4. Several of the most important studies furnish

peculiarly strong and appropriate material for moral instruction.

5. The school is not narrowed to ethical theory. As a social organization, through its activities and discipline, it furnishes also the transition from theory to practice and conduct.

6. A fairly complete and practical scheme of moral education on the basis of ethics and pedagogy is within the reach of all teachers.

7. Every wise and benevolent person knows that the first and last question to ask and to answer regarding a child is, "What are his moral quality and strength?" (49:12 f.).

The last sentence indicates the narrowness in which this aim is frequently conceived. In McMurry's discussion of the relative value of studies, one has the feeling that the sciences, for example, are brought into the curriculum in an arbitrary manner. They do not square with the aim, but common sense wants them, and so we shall have them. Such attempts cause De Garmo to say that "the Herbartian who lays all stress upon 'the development of moral character' transforms such subjects as mathematics, science, and accessories like physical and manual training, into mere tails to the literary and biblical kite" (14:38).

The trouble here arises from the fact that an effort is made to make a part serve for the whole. Morality is a large and never-to-be-forgotten element in man's life, but it is not all of it. We are dealing here with a statement of aim that is still more partial than social efficiency. Just as adjustment to life includes social efficiency, so social efficiency includes moral character, and both are included by the first mentioned.

There is a tendency in modern educational and ethi-

cal writings to use the words "moral" and "social" as synonymous. Among the writers who do this may be mentioned Herbart, Spencer, Dewey, and Bagley. Bagley definitely argues for "the equivalence of the terms 'social' and 'moral'" (4: 59), while the other writers mentioned implicitly assume their equivalence. From the theoretical standpoint this usage may be justifiable, but in its effect upon the popular mind it has so far proved quite futile, and it probably always will. In the popular mind these two words are not synonymous. When we say that a man is socially efficient, we do not mean the same thing as when we say that he is moral. It may be unfortunate that this is the case, but that it is the case cannot be denied and should be recognized. To disregard it in our theoretical discussions does not remove the fact, but only tends to bring about confusion.

Now while we all feel that there is a difference between the meaning of "moral" and "social," it is not so easy to indicate precisely wherein this difference consists. Looking at the words interchangeably, it is evident that the meaning of "moral" is narrower than that of "social." It is clear enough that every moral act is also a social act, but custom is not so willing to say that every social act may also be designated by the word "moral." By the force of tradition, the word "moral" has come to designate a particular group of social acts, and in many minds it is restricted to but one type of such acts, — the relations between the sexes. On the whole, however, we come very near the truth when we say that custom has restricted the word "moral" to the injunctions of the Decalogue. This restriction is arbitrary, instead of logical, and therefore cannot be indicated with greater scientific precision, but the word

conveys this meaning so generally that it is worse than idle to ignore the fact. Our vocabulary apparently needs this word in its narrow and commonly accepted meaning, and we shall use it in this sense in these pages. The word that should be used in place of "moral," as synonymous with "social," is "ethical."

28. The Aim of Good Character. This narrow meaning of the word "moral" is one reason why that word has been displaced in educational discussions by "social." "Social" has all the advantages of "moral" without its disadvantages. But there are other ways out of the difficulty that confronts us here. Superintendent O. I. Woodley substitutes the word "good" for "moral," and states the aim of education as *the development of good character.*[1] A *good* character he describes as one that embodies the best ideals of the civilization of which he is a part. Twentieth-century American character would embody in itself present-day American ideals, of which religious, social, political, and industrial ideals may be specified.

So worded, this aim evidently becomes as broad or as narrow as the meaning that is read into the word "good." As interpreted by Woodley, this aim probably includes just what the adjustment aim includes, and the difference becomes one largely of phraseology and point of view. But as this aim stands, it defines education merely from the subjective standpoint, leaving the objective aspect of man's life, for which education must also prepare, to be understood, or to be gratuitously supplied when the aim is interpreted. The formulation as it stands corresponds to the second half of the aim as we have stated it on page 39, and there-

[1] Unpublished.

fore it should logically be classed with the formal aims in the next chapter. But this aim is so closely related to the content aims treated in this chapter that it is more expedient to treat it here also.

Ethically, it is essential that the subjective aspect of the aim be explicitly stated, but when it is recognized that the aim of education should render primary service in the selection of studies, it is evident that the subjective aspect could be more easily spared in the statement than the objective, or environmental aspect. Both are, however, essential in a complete formulation, and when either is omitted, the formulation is in so far defective, no matter how it is ultimately interpreted.

But there is yet another respect in which the formulation of the aim of education as good character is inferior for the scientific thinker to the formulation of the aim as adjustment to life. The latter is given purely from the scientific point of view, which is impartial, while the former is given from the human point of view, and so possesses a human or personal bias. This may at first glance appear as a merit rather than as a defect, but a little serious reflection should make it clear that this is a defect. Character and morality, with which education unquestionably deals in a very fundamental way, are scientific as well as personal facts, and until education adopts the scientific instead of the personal point of view in regard to them, it cannot hope to command the respect of scientific men and to make genuine and disinterested progress.

The aims of moral and of good character have served to emphasize the moral and character elements in man's life. These are of fundamental importance, and no discussion of the aim of education can ever be

complete without giving them explicit attention. Man is adjusted to his environment through his subjective nature. It is not sufficient that his intellect be stored with information, but his moral impulses must also be awakened and character formed if he is to become a thoroughly reliable member of society. The moral status of the business world is far from what it might be, and while all the blame for this cannot be shouldered on the schools, some of it undoubtedly can. Man's environment includes elements that absolutely demand moral sensitiveness and reliability of character, and educational theory and practice must ever bear this in mind. The home, the institution of property, and other equally cherished aspects of man's life rest upon moral traits. The discussion of the ways and means of moral instruction and training belongs to the Principles of Teaching, only the aim concerning us here; but the matter will come up again from a different point of view in chapter ix.

29. The Aim of Complete Living. A statement of the aim of education that has been current since the publication of Spencer's "Education" in 1860 is that of *preparation for complete living*. This is the formulation preferred by Hanus, who defines it as follows: "To live completely means to be as useful as possible and to be happy. By usefulness is meant service, *i. e.*, any activity which promotes the material and spiritual interests of mankind, one or both. To be happy one must enjoy both his work and his leisure" (32 : 5).

For the most complete statement of this aim one must go to Spencer. He says in part: —

How to live? — that is the essential question for us. Not how to live in the mere material sense only, but in

the widest sense. The general problem which comprehends every special problem is — the right ruling of conduct in all directions under all circumstances. In what way to treat the body; in what way to treat the mind; in what way to manage our affairs; in what way to bring up a family; in what way to behave as a citizen; in what way to utilize all those sources of happiness which nature supplies, — how to use all our faculties to the greatest advantage of ourselves and others; how to live completely? And this, being the great thing needful for us to learn, is, by consequence, the great thing which education has to teach. To prepare us for complete living is the function which education has to discharge; and the only rational mode of judging of any educational course is to judge in what degree it discharges this function (70 : 30).

The leading types of activity that constitute human life, and that education should meet, are thus classified: —

1. Those activities which directly minister to self-preservation. 2. Those activities which, by securing the necessaries of life, indirectly minister to self-preservation. 3. Those activities which have for their end the rearing and discipline of offspring. 4. Those activities which are involved in the maintenance of proper social and political relations. 5. Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings (70 : 32).

In this definition of the aim, the word "complete" has always caused trouble. What is *complete* living, and how are we to know when it is attained? The word is not sufficiently specific, and it is not evident how there can be any effective concentration in education under

its guidance. This criticism was anticipated by Spencer as follows: —

> Of course the ideal of education is complete preparation in all these divisions. But failing this ideal, as in our phase of civilization every one must do more or less, the aim should be to maintain *a due proportion* between the degrees of preparation in each. Not exhaustive cultivation in any one, supremely important though it may be; not even an exclusive attention to the two, three, or four divisions of greatest importance; but an attention to all, — greatest where the value is greatest, less where the value is less, and least where the value is least (70 : 35).

That is, Spencer does not necessarily mean *complete* living, in the sense of maximum achievement throughout, but rather *balanced* or *harmonious* living.

With this interpretation in mind, we see that Spencer means by "complete living" nothing different from what we mean by adjustment to life. The relative merit of the two formulations apparently rests entirely on the adequacy of their wording. But in this respect it seems clear that the formulation we have adopted has the advantage. It is unquestionably more definite, and our full statement specifies both the objective and subjective aspects of the educative process, which are its most fundamental characteristics, while Spencer's formulation does not specify either one, and so does not penetrate the educational problem at all. When education is defined as the process of adjusting man to those elements of his environment that are of concern in present human life, and of conferring upon him the ability to make efficient and proper use of his own powers, or by some equivalent statement, a definite and fruitful beginning is made in educational analysis. The foundation is laid for both

the principles of education and the principles of teaching. It is recognized at the outset that education is relative to the native powers of the person who is educated and to the environment for which it must prepare. This lays the basis for the scientific investigation in both directions.

Educational psychology and the principles of teaching have received independent recognition for some time, but it has not always been explicitly recognized that the content of education must be determined by means of an inductive inquiry into man's environment. Education must not only be based upon the science of the mind, but for its content it must be based on the objective aspects of human life. These two phases of the problem are obviously interrelated, but in the exposition of educational theory it is practically necessary to give them separate treatment. The contention that the objective aspects of man's life grow out of his subjective nature, and so may be deduced therefrom, cannot be worked out in practice. Outside of our own immediate introspection, which is difficult and frequently faulty, we must always infer subjective nature from objective activities, and even with ourselves this order is usually the better one. A person has his capacities for art, literature, and science revealed to him by exercising himself in art, literature, and science, and without such exercise he really does not know himself.

30. Conclusion. In concluding this chapter it may be said that the various statements of the aim of education that we have considered all include about the same things when elaborated. There is little or no disagreement among educators about the fundamentals of education itself, and the divergences that exist arise mainly

out of the attempts at definition. This makes the differences lie far more in verbal statement than in educational content, but it does not necessarily render the differences innocuous. The various formulations that are current are not all of equal merit, and unless the student clearly understands the import of their differences in wording, confusion is likely to result. An acceptable formulation must (1) be broad enough to include all phases of human life, and (2) it must be both objective and subjective in its reference. The social aim, as defined by Dewey, explicitly meets the second criterion, but lacks in breadth. The moral aim lacks still more in breadth, but as morality is both subjective and objective in its reference, this aim may be taken to meet the second criterion by implication. The aim of good character, while broad enough as interpreted, is nevertheless subjective only as it stands, and, together with the aim of complete living, it is so indefinite that all real meaning must be read into it.

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CHAPTER V

OTHER STATEMENTS OF THE AIM OF EDUCATION

(B) *Formal Aims*

31. Acceptance of Formal Aims. The various aims of education discussed in the preceding chapter are all held by present-day specialists in education, as is evidenced by the quotations from current writers. This cannot be said so generally of the aims now to be discussed, but as they are still widely accepted by writers and teachers who are not educational specialists, and as their consideration will serve to make the essential qualities of an educational aim still more explicit, we must study them.

32. Content and Formal Aims Distinguished. The sub-titles of these two chapters serve to indicate the essential point of difference between the two classes of aims. One class may be termed "content aims" because all the aims in it make more or less explicit reference to the content of the life and environment for which education is to prepare, while the other class may be termed "formal aims" because, as will be seen, the aims under it have primary reference to the nature of the person who is educated, and to the formal changes in disposition and abstract mental powers that education should produce. The terms "sociological" and "psychological," or "objective" and "subjective," might be used in place of "content" and "formal,"

but they do not express the essential thought here so well. "Sociological" has the same limitations as "social," discussed in the preceding chapter, and "psychological" might not include such subjective metaphysical speculations as those of Froebel, for example; while "objective," strictly interpreted, would exclude certain subjective aspects that are contentful rather than formal, and "subjective" would wrongly include these same aspects. As a case in point may be mentioned the appreciation of art or of literature, which is certainly contentful, but which may also be classed as subjective.

Logically, it is obvious that we should have three classes of educational aims instead of two. There should be the contentful aims that have objective reference, the formal aims that have subjective reference, and a third class that properly combines the two. The class omitted here is really the first, or objective, and the word "contentful" is used to designate the third. Only two classes are made, because the first is practically non-existent. There are no educators who restrict themselves to the intrinsic value of knowledge, omitting entirely the formal values. As a matter of fact, the reverse statement is also true, namely, that there are no educators who restrict themselves to the formal value of education, omitting entirely the intrinsic value of knowledge. The differences that are actually found are differences of emphasis, one group of educators emphasizing the content side of education and the other the formal side. In the content class we may place all educational aims that subordinate the formal value of education, without, however, necessarily disparaging it, while in the formal class we may place all aims that coördi-

nate the formal with the contentful, or that actually place the formal above the contentful.

33. The Doctrine of Unfoldment. A typical definition of the formal type is given by Stein, who says: —

Education is the harmonious and equable evolution of the human faculties by a method based upon the nature of the mind for developing all the faculties of the soul, for stirring up and nourishing all the principles of life, while shunning all one-sided culture and taking account of the sentiments upon which the strength and worth of men depend.

Pestalozzi speaks of the purpose of education as follows: —

Education means a natural, progressive, and systematic development of all the powers.

To engage the attention of the child, to exercise his judgments, to open his heart to noble sentiments, is, I think, the chief end of education; and how can this end be reached so surely as by training the child as early as possible in the various duties of domestic life? (59 : 358.)

Sound education stands before me symbolized by a tree planted near fertilizing waters. A little seed which contains the design of the tree, its form and its properties, is placed in the soil. The whole tree is an uninterrupted chain of organic parts, the plan of which existed in its seed and root. Man is similar to the tree. In the new-born child are hidden those faculties which are to unfold during life. The individual and separate organs of his being form themselves gradually into unison, and build up humanity in the image of God. The education of man is a purely moral result. It is not the educator who puts new powers and faculties into man, and imparts to him breath and life. He only takes care that no untoward influence shall disturb

nature's march of development. The moral, intellectual, and practical powers of man must be nourished within himself and not from artificial substitutes.

Froebel takes very much the same view of education as Pestalozzi, complicated somewhat by his philosophy, but it is not so easy to pick from his works quotations that concisely express his position. In the opening chapter of "The Education of Man" he gives this definition: "Education consists in leading man, as a thinking, intelligent being, growing into self-consciousness, to a pure and unsullied, conscious and free representation of the inner law of divine Unity, and in teaching him ways and means thereto."

These definitions vary in their wording, but they are much alike in meaning. They all have reference to the organization, development, and unfoldment of man's powers or faculties, and they imply or specify that this process should be harmonious and equable. The child is compared with the growing flower that must be brought to its formal perfection of bloom. The content of what the child is taught is not emphasized, for that is looked upon as secondary. External conditions must, indeed, be right, but chiefly or only because of their formal subjective influence. This educational doctrine may be called the *doctrine of unfoldment.*

All the quotations that we have given come from the beginning of the nineteenth century, when the psychological aspect of education was in its prime, but this aspect was held long before that time, and has been held much later. It has been given expression in practically every period of history. Plato, writing nearly four hundred years before Christ, said: "Education consists in giving the body and the soul all the perfection of

which they are capable"; while Angell, writing in 1908, says: "Education has as its function the symmetrical development of the powers of the individual" (3 : 11).

34. **The Doctrine of Formal Discipline.** Another educational doctrine that belongs to the formal class is the *doctrine of formal discipline.* This doctrine does not so much concern itself with the harmonious unfoldment of all the powers, which implies a wide range of activity, but it rests on the assumption that a mental power may be exercised and perfected in a narrow range of activity, and that it may then be applied in any department of human life. Reasoning power might thus be developed in geometry, and then be used generally in law or business. The generalization or transfer of the power that has been exercised is the keynote of the doctrine, and distinguishes it from the preceding, which makes no reference to such generalization. This distinguishes the two doctrines in theory, but in the literature of education it is not always easy to tell on which side a certain writer belongs. The two doctrines are not incompatible, and one and the same writer may hold to both, and he may do this without recognizing them as two. A writer who holds to them both without distinguishing them can be classified merely as subscribing to a formal conception of education.

35. **"Discipline" and "Training" Distinguished.** The word "discipline" must be carefully distinguished from the word "training." This is not always done, and the result leads to much ambiguity and confusion. By "discipline" in educational and psychological literature is technically meant the formal development of the mental powers irrespective of knowledge content, and the general application of these powers in the activ-

ities of life, as developed in the preceding paragraph. By "training" is meant drill in the performance of some specific activity for the sake of performing that activity. Thus, a person may be trained in addition, in teaching, or in judging stock, to the end that he may become proficient in addition, in teaching, or in judging stock. Any further results are incidental and secondary from this point of view.

36. The Doctrine Illustrated. Like the doctrine of unfoldment, the doctrine of formal discipline has been held throughout history, and has frequently been widespread. The Greeks assumed it in theory, and rested their educational system upon it. In the modern form it began its rise, gradually at first, at the time of Locke (1632–1704), and it is only now beginning to wane. Because of its present or recent vitality, and the amount of scientific work that has been done upon it, we shall consider it in some detail in the next chapter. Here we shall note only its formal and subjective nature.

Locke did not hold to this doctrine consistently throughout his writings. In his "Thoughts Concerning Education" he scarcely intimates it, but the following quotations from his "Conduct of the Understanding" are entirely in harmony with it: —

Would you have a man reason well, you must use him to it betimes; exercise his mind in observing the connection of ideas and following them in train. Nothing does this better than mathematics, which therefore should be taught all those who have the time and opportunity, not so much to make them mathematicians as to make them reasonable creatures. . . . Not that I think it necessary that all men should be deep mathematicians, but that, having got the way of reasoning, which that

study necessarily brings the mind to, they might be able to transfer it to other parts of knowledge as they shall have occasion (pp. 23, 26).

The business of education . . . is not, as I think, to make them [the young] perfect in any one of the sciences, but so to open and dispose of their minds as may best make them capable of any when they shall apply themselves to it. . . . It is therefore to give them this freedom that I think they should be made to look into all sorts of knowledge, and exercise their understandings in so wide a variety and stock of knowledge. But I do not propose it as a variety and stock of knowledge, but a variety and freedom of thinking; as an increase of the powers and activity of the mind, not as an enlargement of its possessions (p. 44).

Huxley's famous definition of a liberal education is also written primarily from the disciplinary point of view, although it does not fail entirely to refer to the content of education. It runs as follows: —

That man, I think, has a liberal education who has been so trained in youth that his body is the ready servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold, logic engine, with all its parts of equal strength, and in smooth working order; ready, like a steam engine, to be turned to any kind of work, and spin the gossamers as well as forge the anchors of the mind; whose mind is stored with a knowledge of the great and fundamental truths of nature, and of the laws of her operations; one who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heel by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of nature or of art, to hate all vileness, and to respect others as himself. Such an one, and no other, I conceive

has a liberal education; for he is, as completely as a man can be, in harmony with nature (38 : 86).

Fouillée continually takes the view that mental force and intellectual power can be developed quite apart from knowledge content. The following quotation is typical:

The scientific man is not made by teaching him science, for true science, like poetry, is invention. We can learn to build a railway by rule of thumb, but those who invented railways did so only by the force of the intellectual power they had acquired, and not by the force of the mere knowledge they had received; it is therefore intellectual force that we must aim at developing (28 : 38).

Fouillée evidently confuses native with acquired capacity, and the selective with the preparatory function of education.

In recent educational writings this doctrine is so generally assumed that further quotations are unnecessary.[1] A number are included with the exercises at the close of the chapter. The doctrine assumes that "Discipline as a process creates power and converts this power into skill. Some of the special intellectual qualities included under the term are *insight* or *penetration*, *comprehension*, *versatility*, *good judgment*, *discrimination*" (62 : 154).

37. Formal Aims Criticised. All formal aims of education may be criticised together by pointing out that they are non-selective. Such aims hold the same relation to the curriculum as subjective standards in ethics hold to the content of the moral life. To say, for example, that pleasure, even in the highest sense, should be

[1] For a collection of such quotations from modern educational and psychological literature, see Thorndike, *Educational Psychology*, pp. 82–84.

the criterion of conduct scarcely gets us started in ethical inquiry. It is non-selective and guides us nowhere. Pleasure, or even happiness, or blessedness, is not something that can be directly chosen or picked up, for by itself it has no existence. It is always connected with particular objects or activities, and can be obtained only by choosing those objects or activities. In education we have a precisely similar situation. Formal aims point inward to the mind merely, and not outward to the world, and so give us no objective criterion for the evaluation and selection of subject-matter. The phrases "unfoldment of the powers" and "mental discipline" no doubt imply a careful study of the mind in order that the process of unfoldment or discipline may be most efficiently accomplished, but they give no hint that the material of education itself should be selected with reference to future usefulness. If it were discovered, for example, that solving puzzles unfolded or disciplined the mind best, this should then, *ipso facto*, comprise the material of education. Nor is this overdrawn. Locke recommends the study of mathematics for precisely this reason, and the study of Latin and Greek is still frequently defended on this ground. C. Lloyd Morgan, in his "Psychology for Teachers," says: "It is as a means of training the faculties of perception and of generalization that the study of such a language as Latin in comparison with English is so valuable" (p. 186).

But this criterion is palpably inadequate, for education is inherently a two-sided process. It implies an organism with a plastic nature on the one hand, and an objective world to which it must be adjusted on the other. Neither of these aspects can be omitted, and the content aims either imply both or explicitly state them. One guides

us to the material and aims of instruction, and the other discloses the possibilities and methods of training. One gives us the studies and exercises of the school, and the other our genetic and educational psychology.

When we push our examination of the formal aims still farther, we find that both types are meaningless as they stand. What is to be our criterion in judging the effectiveness or value of any particular kind of unfoldment or discipline? Unless we accept a mere say-so, it cannot be anything but the objective requirements of life. Every word in a formal statement of the aim gets its meaning from these requirements. The merit of unfoldment or discipline must always be judged by its consequences in action, and this is the criterion that is usually assumed and is sometimes explicitly stated. That variety of unfoldment or discipline is good which makes for efficient life in business, on the farm, or in the professions. Says Joseph Payne: "The study of the Latin language itself does eminently discipline the faculties and secure in a greater degree than that of the other subjects we have discussed the formation and growth of mental qualities which are *the best preparation for the business of life*" (61 : 264).[1]

Whether this statement, implied or expressed, really saves these aims we shall consider in the next chapter.

38. Content Side not Always Omitted. To say that all those who pin their faith to a formal definition of education entirely neglect the objective requirements of life in their evaluation of subject-matter would not be just. While some, at least occasionally, take this extreme position, others do not. The second quotation from Pestalozzi (p. 74) makes distinct reference to

[1] Italics mine.

domestic duties as means of education, but they are looked upon merely as means, and almost apologetically. They are regarded as subordinate to the subjective qualities to be developed. Froebel is more outspoken in this respect, and more than once gives expression to sentences such as this: "Education must not only be founded on life as it actually appears, must not only be connected with life, but must also form itself in harmony with the requirements of life, of the surroundings, and of the time, and with what they offer." This recognizes the needs of the objective aspects of life explicitly, and shows the difficulty of making rigid classifications. The difference is sometimes merely one of emphasis. Herbart is usually placed on the formal or psychological side instead of the content or sociological. He places his emphasis mostly on subjective qualities, but morality, his avowed aim, points directly to society.

39. Historical Considerations. The discussion of the development of educational theories should be left to the history of education, but historical considerations throw so much light on the interrelations of the various aims we have discussed, that a short digression is in place at this point. Modern education may be said to begin with the Renaissance. At that time the heart and soul of classical culture were rediscovered, and the classical languages took a new and vital position in the curriculum. At first these languages were studied for the content and life they contained, but this soon degenerated into formalism.[1] The languages, especially Latin, were studied for the language merely, and a

[1] The word "formal" here has reference to the form, as opposed to the content, of the subject-matter, and not to the form of the mind as above.

certain kind of technical knowledge came to be the end. This was assisted by the trend taken in religious education, which also became formal and dialectical, and in the eighteenth century, during the period of the enlightenment, formalism was also reinforced by the realistic movement. Social philosophy was individualistic, and the aim of culture came to be a soulless, formal, aristocratic display of knowledge and exact propriety. Naturally, a reaction took place.

This reaction was headed by Rousseau, followed by Basedow, Pestalozzi, Herbart, and Froebel. Seeing the results of the prevailing intellectual culture, and the uses to which knowledge was being put, Rousseau condemned it all, and called out for a return to Nature. The child, and not knowledge, was to be made the center of education. Heretofore child-nature had not been recognized. The child was looked upon as a miniature adult. He was dressed like the adult, was expected to act like the adult, and he studied the same things as the adult, only in a less degree.

This reaction gave rise to the psychological aim of education that we have called the doctrine of unfoldment. The center of gravity was shifted from knowledge to the child, and to "psychologize" education, to adapt it to the nature of the child, and to unfold his developing powers, became a fad.

The content of the curriculum was not always affected by this movement. Pestalozzi, indeed, laid stress upon domestic duties and neighborhood industries as educational forces, but usually it was a more natural and easy way of learning Latin that was sought. That is, the psychological tendency early took the direction of improving the method of teaching instead of reform-

ing the curriculum, the sphere to which we now see that it primarily, although not solely, belongs.

The reform of the curriculum itself was begun by the realistic movement of the sixteenth and seventeenth centuries, and was effectively continued by the scientific and sociological tendencies of the nineteenth century. In the sociological tendency Pestalozzi, Herbart, and Froebel also participated. These two tendencies formed parts of one and the same movement, — the movement toward the objective side of social betterment, — and they have conjointly given us the content aims of education as we now have them. The scientific tendency was but an aspect of the sociological, a relation that would come out more clearly if the word "content," instead of "sociological," were used, for that clearly includes the sciences, but the latter is the word generally used in the histories of education. The psychological and sociological tendencies are thus seen to be in no wise contradictory, but to be supplementary to each other. Briefly, one gives us the method, and the other the content of education.

The realistic movement of the sixteenth and seventeenth centuries was, through its formal tendency, not only in part responsible for the naturalistic and psychological reaction, but it also had much to do in bringing forward the doctrine of formal discipline. It did this by laying emphasis on the study of natural objects and other things in the environment, and prosecuting this study through the vernacular. The traditional classical curriculum thus became undermined, and its advocates had to look for new support. This they found in the supposed disciplinary value of the classics. No proof was advanced for this value, and the peculiar

thing is that it was not questioned by its opponents, who met the issue by claiming equal disciplinary value for the new subjects, which had the additional advantage of greater practical value.

EXERCISES

1. May the aim and the meaning of education be distinguished and separately treated? (See KEITH.)

2. Davidson characterizes education as a process of world building. Justify this characterization.

3. Point out how the aim of adjustment includes those of utility, knowledge, unfoldment, and discipline.

4. Could Huxley's definition of a liberal education be otherwise classified than as a formal aim, as is done in the text? Why?

5. What other criticisms may be offered against the aim of the harmonious development of all the powers than are offered in the text? (Cf. 4 : 50 f.)

6. There is a tendency now to use the words "moral" and "social" as synonymous. Can this be done? If not, where is the line to be drawn between them?

7. Show that, while the aims of adjustment, social efficiency, good character, and complete living differ more in words than in substance, they are, nevertheless, written from different points of view.

8. Discuss: "I believe that to set up any end outside of education, as furnishing its goal and standard, is to deprive the educational process of much of its meaning, and tends to make us rely upon false and external stimuli in dealing with the child" (44 : 5).

9. In what sense are the words "discipline" and "training" used in the following? "But under the dominance of Christianity education received a wholly new character. Instruction in doctrine and training in Church ceremonials were substituted for the intellectual element; rigid discipline

in conduct, for the physical and rhetorical training. . . . From the point of view of this discipline, all that was an outgrowth of natural interests was to be suppressed" (52 : 101).

"Culture . . . represents the vital union of information and discipline" (16 : 19).

10. Classify the following definitions of education, or state from what point of view each is written : —

1. The end of education is community life. — F. W. PARKER.

2. Education is a development of the whole man. — COMENIUS.

3. Education is a conscious or voluntary evolution. — DAVIDSON.

4. Education aims at the realization of the typical man. — PAYNE.

5. Education is the art of forming men, not specialists. — MONTAIGNE.

6. Education means the universal distribution of extant knowledge. — WARD.

7. It is the business of education to develop the ideal prize man. — RICHTER.

8. The work of education is to make changes in human minds and bodies. — THORNDIKE.

9. What sculpture is to the block of marble, education is to the human soul. — ADDISON.

10. The attainment of a sound mind in a sound body is the end of education. — LOCKE.

11. Education is not the storing of knowledge, but the development of power. — ORCUTT.

12. Education is any process or act which results in knowledge or power or skill. — WHITE.

13. The end of education is to produce a well-balanced and many-sided interest. — HERBART.

14. The end of education is to train away all impediment, and to leave only pure power. — EMERSON.

15. The true aim of education is the attainment of happiness through perfect virtue. — ARISTOTLE.

16. The realization of all the possibilities of human growth and development is education. — PARKER.

17. The object of education is preparation for more effective service in state and church. — LUTHER.

18. The aim of education is the forming of a complete man, skilled in art and industry. — RABELAIS.

19. The primary principle of education is the determination of the pupil to self-activity. — HAMILTON.

20. The proper education of to-day is a preparation for the duties and responsibilities of life. — C. M. WOODWARD.

21. Education is the process by which the individual man elevates himself to the species. — ROSENKRANZ.

22. The object of education is the realization of a faithful, pure, inviolate, and hence holy life. — FROEBEL.

23. Education is a process of becoming socialized by participation in the actual and ideal life of the race. — KEITH.

24. Morality is universally acknowledged as the *highest* aim of humanity, and consequently of education. — HERBART.

25. The main purpose of education is to permit the individual to participate in the conscious knowledge of the race. — PAYNE.

26. The educational ideal is an adequate participation in the present life of the race and in the ideals of the race. — KEITH.

27. Teaching may be defined as the awakening of another's mind, and the training of its faculties to a normal self activity. — F. H. PALMER.

28. The college . . . should give . . . elasticity of faculty and breadth of vision, so that they shall have a surplus of mind to expend. — WOODROW WILSON.

29. The end of education is triple: (1) To develop the mental faculties, (2) to communicate knowledge, and (3) to mould character. — THIRY.

30. The aim, then, of education being flexibility and exactness, we have to consider by what means these two ends can best be reached. — MATTHEWS.

31. Education is the organization of acquired habits of

action such as will fit the individual to his physical and social environment. — WILLIAM JAMES.

32. The end of education is to render the individual as much as possible an instrument of happiness, first to himself, and next to others. — JAMES MILL.

33. Education, in the most extensive sense of the word, may comprehend every preparation that is made in our youth for the sequel of our lives. — PALEY.

34. The function of education is to assist and direct the processes of physical and mental growth during the formative periods of childhood and youth. — PAINTER.

35. I call a complete and generous education that which fits a man to perform justly, skillfully, and magnanimously all the offices, both public and private, of peace and war. — MILTON.

36. Arithmetic, if judiciously taught, forms in the pupil habits of mental attention, argumentative sequence, absolute accuracy, and satisfaction in truth as a result. — JOSEPH PAYNE.

37. It is the purpose of education so to exercise the faculties of the mind that the infinitely varied experiences of after-life may be observed and reasoned upon with best effect. — JEVONS.

38. Education may be tentatively defined . . . as the process by means of which the individual acquires experiences that will function in rendering more efficient his future action. — BAGLEY.

39. One great end of education is to communicate to the pupil that sort of knowledge which is most likely to be useful to him in the sphere of life which Providence has assigned to him. — TATE.

40. Education is the process of remaking experience, giving it a more socialized value through increased individual experience, by giving the individual better control over his own powers. — DEWEY.

41. The faculty which is by far the most important of the mind, and which we must earnestly strive to develop and

perfect in our pupils, is the faculty of judgment, or the reasoning faculty. — BABBITT.

42. The purpose of education is to train children, not with reference to their success in the present state of society, but to a better possible state, in accordance with an ideal conception of humanity. — KANT.

43. It has been well said that an educated man has a sharp axe in his hand, and an uneducated man a dull one. I should say that the purpose of a college education is to sharpen the axe to its keenest edge. — NATHANIEL BUTLER.

44. Education is the preparation of the individual for reciprocal union with society; the preparation of the individual so that he can help his fellow-men, and in return receive and appropriate their help. — W. T. HARRIS.

45. Education is the sum of the reflective efforts by which we aid nature in the development of the physical, intellectual, and moral faculties of man in view of his perfection, his happiness, and his social destination. — COMPAYRÉ.

46. Education includes the culture which each generation purposely gives to those who are to be its successors in order to qualify them for at least keeping up, and, if possible, raising the improvement that has been attained. — MILL.

47. Education is the acquiring of such knowledge in such a way as shall enable us to appreciate the true value of external and internal conditions; to adjust ourselves to them; to adapt ourselves to progressive conditions. — F. C. LUCK.

48. The value of the study of German "lies in the scientific study of the language itself, in the consequent training of the reason, of the powers of observation, comparison, and synthesis; in short, in the upbuilding and strengthening of the scientific intellect." — CALVIN THOMAS.

49. Education is the instruction of intellect in the laws of nature; under which name I include, not merely things and their forces, but men and their ways; and the fashioning of the affections and the will into an earnest and living desire to move in harmony with their laws. — HUXLEY.

50. A liberal education is one in which the mind is culti-

vated, not as an instrument toward some ulterior end, but as an end to himself alone; in other words, an education in which his absolute perfection as a man, and not merely his relative dexterity as a professional man, is the scope immediately in view. — HAMILTON.

COLLATERAL READING AND REFERENCES

BAGLEY, Educative Process, 40–55.
MATTHEWS, Principles of Education, 7–11.
MONROE, Brief Course, 254–409.
MONROE, Text-Book, 505–759.
O'SHEA, Education as Adjustment, 57–75, 133–153.

CHAPTER VI

THE DOCTRINE OF FORMAL DISCIPLINE

40. The Question at Issue. The nature of the doctrine of formal discipline was briefly indicated in the preceding chapter. In criticism the point was made that the doctrine is non-selective in regard to the objective content of the curriculum, and that it is in so far defective. But perhaps there is no need of an educational criterion to be objectively selective; perhaps formal training is extensively possible and constitutes a sufficient preparation for meeting the various activities of life. If this be so, we have here an adequate guide for the activities of the school. The question is one that must obviously be considered on its merits as revealed by discussion and scientific investigation.

41. The Doctrine Stated. The advocates of this doctrine maintain that the chief, if not the sole, value of the educative process consists in the formal development of the mind's powers, in producing a fund of mental force or strength, and in establishing certain generalized habits. Content or intrinsic values are either disregarded altogether, or are given a secondary position. It makes little difference what is studied so long as it is studied right. The benefit received comes from the process of acquisition rather than from the content acquired.

The powers and habits once developed may then be applied in the various activities of life with little or no loss of effect. The power of reasoning developed in mathematics or logic may later be used in law, medicine, or

business; and the habit of concentration developed in solving problems in cube root or in translating Greek may be likewise extended. Observation, memory, diligence, accuracy, and other habits and powers are taken to be subject to the same rule. It has even been maintained that the benefit accruing is still less specific. Fouillée assumes that the result of education is a fund of mental power or force which is developed by any mental activity whatsoever, and which may later be drawn off by any activity whatsoever. (See above, p. 79.) From this point of view the mind may be likened to a storage battery that may be charged, and the power accumulated may then be used quite independent of its origin. Roark reaches a similar conclusion, but in a different way. He argues as follows: —

Since the mind is a unit and the faculties are simply phases or manifestations of its activity, whatever strengthens one faculty indirectly strengthens all others. The *verbal* memory seems to be an exception to this statement, however, for it may be abnormally cultivated without involving to any profitable extent the other faculties. But only things that are rightly perceived and rightly understood can be *rightly* remembered. Hence, whatever develops the acquisitive and assimilative powers will also strengthen memory; and conversely, rightly strengthening the memory necessitates the developing and training of the other powers (64: 27).

42. Origin in False Psychology. It is evident from these characterizations, whether their conclusions are false or true, that they have their origin in false psychology, in part at least. Roark assumes a mind with a homogeneous unity something like that of a carpenter's tool, say a hatchet. The variety of the uses to which a

hatchet can be put corresponds to the variety of the functions of the mind, and as the whole of the hatchet is always acting in any situation, so the whole of the mind is always acting. Improving such a homogeneous object for one function would naturally improve it about equally for all functions. But it is evident to the merest tyro in psychology that the localization of function in the brain precludes any such unity of the mind. The unity of the mind is far more like that of the body than that of the hatchet. It is a unity of function through a variety of parts or organs, and not a unity of structure.

A similar criticism holds against the assumption of Fouillée, that the mind is a reservoir of force or energy. According to the researches of recent psychology, the mind is not any such thing, and any deductions made from the assumption must be looked upon with suspicion.

Another system of psychology that favors formal culture is the antiquated faculty psychology. This is no longer held by any recognized psychologists, but its validity is still often naïvely assumed by teachers and by writers on education. It errs in assuming too much independence for the various parts or faculties of the mind. It assumes that observation, memory, imagination, reason, feeling, etc., are entities, something like carpenter's tools, that may be improved or injured in and by themselves. Instead of being analogous to one tool, the mind is here made to be analogous to a set of tools. The different faculties are not taken to exist in complete isolation from one another, yet it is assumed that each faculty can be developed quite independently of the others. Observation, for example, might be developed by the sciences, reason by mathematics, memory by the languages, and feeling by literature.

No such distinct faculties as are here assumed are known to modern psychology. It is furthermore recognized that a "faculty" is not a power in itself, but it is a function mediating a relationship between the organism and its environment. It is a mode of reaction that cannot work in a vacuum, but that is conditioned for its efficiency on knowledge content. Native capacity and knowledge are both necessary in order to reason, and one cannot observe efficiently in any field without having a good apperceptive basis for that field. Memory, imagination, and feeling are no less dependent on knowledge.

But on the side of native capacities some modern psychologists have undoubtedly gone too far in denying practically all general powers to the mind. They recognize only particular "connections between particular happenings in the sense organs, and other particular events in the muscles." This is certainly questionable. A person who can reason well in biology, can at least usually not only reason well in the other sciences *as soon as he knows the facts*, but also in history, politics, religion, and other fields. There is evidence that the localization of functions in the brain extends much farther than many psychologists now recognize.

43. Other Fallacies. Thorndike suggests three other fallacies, that are responsible for the origin of the doctrine of formal discipline (74: 93). The first is the fallacy resulting from the neglect of the selective function of education, which we considered in chapter ii. It is true that the students in the classical course of the high school, as a rule, do better in the sciences, history, and mathematics than those in the English course, and the cause is then erroneously attributed to the effect of the study of Latin, rather than to the quality of the students

that are willing to tackle the Latin. I have but recently heard of a high school principal who said that none of his students ever entered the English course if they could possibly get along in the classical course. Such a prejudice is still widespread.

The second fallacy arises from neglect of the factor of "mere inner growth or maturity." As boys and girls mature in passing through the school, their abilities also mature and become more efficient, quite apart from the effect of their school studies. But it is easy, and "suits the vanity of educational theory," to attribute all the increase in efficiency to the effect of the school work.

The third fallacy arises from the tendency to judge others by ourselves. Teachers and educational theorists are likely to rank considerably above the average in intellectual capacity, and so could, even when in school, readily acquire and apply general ideas, and they conclude that this is the tendency of all. "They mistake their own aptitudes at extracting general value from special disciplines for a general trait in human nature."

44. The Literature Classified. The literature discussing and criticising the doctrine of formal discipline has become so extensive that an adequate review of it cannot be attempted here.[1] The data brought to bear on the question are of various kinds, and may be classified under two heads, (1) general discussions, mainly deductive, and (2) inductive investigations. The consideration of the question began with a general argumentative discussion based on common experience, analogy, and deductions from psychological principles, but has in

[1] For a review of the literature on experimental investigations the reader is referred to Thorndike's *Educational Psychology*, chapter viii, and to Bennett's *Formal Discipline*, which supplement each other.

recent years taken the trend of careful inductive investigation based upon experiment. This has already yielded much valuable material.

45. Deductive Discussions. It is pointed out by psychologists that the fact of the specialization of mental traits is incompatible with formal training. If this doctrine were true, we should expect people to manifest at least nearly equal ability in all directions, and certainly in those that are somewhat similar. But we know from every-day observation that a person may be very good in one thing and very poor in another. Zerah Colburn was a genius in mathematical calculations, but beneath average intelligence in other respects. Artistic capacity not infrequently goes with mediocre intellectual capacity, and *vice versa*, and it is by no means rare to find that intellectual capacity in one direction does not correlate with a similar capacity in a slightly different direction. To quote Thorndike: —

Careful measurements show that the specialization is even greater than ordinary observation leads us to suppose. For instance, those individuals who are the highest ten out of a hundred, in the power to judge differences in length accurately, are by no means the highest ten in the ability to judge differences in weights accurately. In fact, they are not very much above the average. The best ten out of a hundred, in observing misspellings in words, are not much better off than the worst ten when we test their ability to observe the shape of objects. Similarly, quickness and accuracy in thinking of the sums of numbers by no means implies equal quickness and accuracy in thinking of the opposite of words (76 : 238).

The modern criticism of the doctrine was begun in Germany by the Herbartians, who maintained "that

since all mental exercise takes its rise in a definite mental content, its character is necessarily determined by its origin" (14 : 32). They reached some valid conclusions, even though not always based on valid premises, and they deserve the credit for having started the ball a-rolling toward the present experimental investigations.

The first critical discussion of the doctrine published in America appears to be one by Dr. Elmer Ellsworth Brown, now United States Commissioner of Education. He published a paper, at present less known than it deserves, entitled "How is Formal Culture Possible?" in the "Public School Journal" for December, 1893. The paper is a direct outgrowth of a discussion by Tuiskon Ziller, in which Ziller maintains the following theses: —

1. Thoughts, feelings, and other mental products which have been cultivated in one department are extended to another and assure to it their aid when both departments are brought into so close connection that the culture of the first is actually reproduced at those points and in those members where the connection is established; and not until then is such aid assured.

2. But a second condition must have preceded that already mentioned, if formal culture is to be certainly attained; the material in question must have been wrought out ideally.

3. But even when this logical elaboration of material is secured in one department, and likewise in the connection of the first department with the second, in one direction as well as in the opposite, the formal effect is secured, thirdly, only on the condition that the material on which it is to be realized is sufficiently well known in its full extent.

These conclusions are accepted by Dr. Brown so far as they go, but he does not think that they go far enough. They pertain only to the intellect, and leave out the will and the feelings. Will, or the tendency to act, he takes to be as fundamental as the intellect, or the tendency to know, and he continues: —

Now, if rudimentary knowledge and rudimentary will are both fundamental facts of mental action, and the one the necessary complement of the other, it would seem as if we might look for formal culture along the line of will as well as along the line of knowledge. Will finds its bearing on the purely intellectual processes in the form of voluntary attention. Another result, then, of thorough instruction in any one field of knowledge, which may be carried over into other fields and find fruitful application there, is increased power of voluntary attention.

Another element of formal culture may be added to Ziller's list; though in its last analysis it may not be essentially different from that already presented. Sound education in any one department of knowledge leads to the formation of methodical habits, or, perhaps better, the habit of method.

Among such habits are mentioned observation, association, induction, and deduction. This is the element that Thorndike has called "identity of procedure."

On the side of the feelings Dr. Brown says: —

There are results in feeling that are carried over readily from one sphere to another, no matter how remote. Note how a general tone of self-confidence, once established in the mind of an otherwise diffident child, braces up every form of mental activity thereafter. There are moral qualities that, once secured, react on intellectual processes, and acknowledge no such bounds

as Ziller imposes. The ardent love of truth, and the sense of intellectual responsibility that may be aroused through instruction, — what mental activity do they fail to touch with vivifying power?

To this aspect of the problem Bagley and others have applied the term "ideals."

Although the paper by Dr. Brown contains apparently the first criticism of the doctrine of formal discipline to be published in America, it does not take first rank in attracting the attention of educators to such criticism. This rank belongs to a paper by Hinsdale, entitled "The Dogma of Formal Discipline," which was the next to appear. This paper was read before the meeting of the National Education Association at Asbury Park, New Jersey, in 1894, and appears in the "Proceedings" for that year. It attracted wide attention immediately, and the doctrine it criticised has been under discussion and investigation ever since.

Like Dr. Brown, Hinsdale takes his start from the Herbartians, and begins with a quotation from Rein. After stating the doctrine, he takes up the various tenets of the disciplinarians, compares mental with physical activities in which training is obviously only partly transferred, and by means of an appeal to common experience, he defends the thesis that the same holds true in the mental sphere. The influence of a study may spread or be transferred (1) by "energizing" the mind, *i. e.*, by exerting a tonic effect on the mind through furnishing brain exercise, and (2) by having elements in common with other studies or activities. Says Hinsdale: —

The power or skill engendered by driving nails can all be used in driving nails, but only partly in shoving

a plane. . . . The law appears to be this: in so far as the second exertion involves the same muscles and nerves as the first one, and, particularly, in so far as it calls for the same coördination of muscles and nerves, the power created by the first exertion will be available. In other words, the result is determined by the congruity or the incongruity of the two efforts.

The fact that "there is no such thing as activity *in vacuo*" is clearly recognized by Hinsdale, and he points out that perception, memory, reason, and other mental powers are conditioned on knowledge content for their activity. He also recognizes that activity in one line need not further activity in other lines, but that it may injure it. In support of this point he cites, among other things, the famous confession of Darwin in regard to the atrophy of his powers of æsthetic appreciation. In early life Darwin was fond of poetry and music, but when he tried to come back to these things after years of incessant work in science, he found that he had lost all taste for them. His mind had become "a kind of machine for grinding general laws out of large collections of facts."

Hinsdale's conclusions, which are not entirely lucid without reading the paper, are as follows: —

1. The power generated by any kind of mental activity must be studied under two aspects, one special and one general.

2. The degree to which such power is general depends upon the extent to which it energizes the mind, and particularly the extent to which it overflows into congruent channels.

3. Such power is far more special than general; it is only in a limited sense that we can be said to have a

store of mobilized power. In a sense men have perceptions, memories, and imaginations, rather than perception, memory, and imagination.

4. While liberal study and specialization look to somewhat different ends, they are, in fact, only parts, and necessary parts, of the same thing.

5. No one kind of mental exercise — no few kinds — can develop the whole mind. That end can be gained only through many and varied activities.

6. No study — no single group of studies — contains within itself the possibilities of a whole education. The balance of development, which we should call a liberal education, can be gained only through a measurably expanded curriculum.

Since this paper by Hinsdale, the discussion has been extensively and progressively continued by O'Shea, Thorndike, Bagley, Horne, Bennett, and others. The conclusions reached are not greatly at variance with one another, and are not so sweeping as those quoted above from Ziller. The transfer of training from one function to another is not entirely denied, but is demonstrated to exist, and the questions that remain are the amount of transfer in the various departments of mental activity, and the manner in which the transfer is effected.

46. Inductive Investigations. These questions evidently cannot be satisfactorily answered by argument and appeal to common experience, but must be submitted to experiment. Apparently the first experiment undertaken in this country that bears directly on this topic was one by William James (39 : 667). This experiment antedates the paper by Dr. Brown, and was really undertaken to test the improvability of native retentiveness. James tried to discover whether a certain amount of daily training in learning one kind of poetry

by heart would shorten the time it takes to learn an entirely different kind of poetry. As subjects he used himself and four of his students, and he measured the time it took to memorize one kind of poetry before and after a fixed amount of training with a different kind. The experiment was not prosecuted with much scientific precision and uniformity, and therefore the results are not entirely trustworthy. In no case was any significant improvement in memorizing manifest, and James thinks that the results support the conclusion that "all improvement in memory consists . . . in the improvement of one's habitual methods of recording facts."

The scientific investigation of this problem was begun in earnest by Thorndike and Woodworth.[1] They "made a great variety of experiments upon the result of training in estimating areas, lengths, and weights of certain shape and size, upon the ability to estimate areas, lengths, and weights similar in shape but different in size, different in shape but similar in size, different in both shape and size. A still more extensive series of experiments measured the influence of training in various forms of observation or perception upon slightly different forms."

They conclude as follows: —

Improvement in any single mental function need not improve the ability in functions commonly called by the same name. It may injure it.

Improvement in any single mental function rarely brings about equal improvement in any other function, no matter how similar, for the working of every mental function-group is conditioned by the nature of the data in each particular case.

[1] *Psychological Review*, vol. viii. Summarized in Thorndike's *Educational Psychology*, pp. 90–92.

The very slight amount of variation in the nature of the data necessary to affect the efficiency of a function-group makes it fair to infer that no change in the data, however slight, is without effect on the function. The loss in the efficiency of a function trained with certain data, as we pass to data more and more unlike the first, makes it fair to infer that there is always a point where the loss is complete, a point beyond which the influence of the training has not extended. The rapidity of this loss, that is, its amount in the case of data very similar to the data on which the function was trained, makes it fair to infer that this point is nearer than has been supposed.

The general consideration of the cases of retention or loss of practice effect seems to make it likely that spread of practice occurs only where identical elements are concerned in the influencing and influenced function.

We cannot attempt to review all the other experiments that have been performed, but we shall consider the conclusions of a few of them in relation to the departments of mental activity which they touch.

Sense-discrimination. In a monograph on "Formal Discipline," Bennett reports three experiments bearing on this topic. The first concerns "the improvement brought about in the discrimination of length by the eye as a result of practice in discriminating length by the knowledge gained from arm movements. There were two subjects, S. and D."

"The result of the experiment was negative. One subject showed improvement in the tests after training; and the other was, to an equal degree, inferior."

Bennett accounts for this in part by the fact that both subjects were skilled experimental psychologists,

"who, as students and teachers, had drilled themselves into many forms of movement."

The next "series of experiments shows the result of special practice in discriminating different saturations of blue upon other sense powers in the case of 16 children. . . . The preliminary and final tests were in discriminating different mixtures (1) of red and white, (2) of yellow and green, (3) of orange and black. There was also a preliminary test in discriminating differences in pitch. Finally the children were tested in discrimination of length, in marking A's, and in accuracy of movement."

The training in discriminating the blues had a marked effect on improving the power to discriminate the other colors, the improvement being nearly as great as for the blues themselves, and there was also a noticeable improvement in the discrimination of pitch. The results in the other tests are not reported.

The third experiment consisted in discriminating lengths of line from a norm. The norm was 10 cm. in length, and the other lines varied from it by 1–10 mm. The preliminary and final tests were divided by two months of practice, four times a week, in duplicating the norm with a pencil. "There was no transfer of training effects, from motor practice to visual practice, but rather a loss."

Bennett is not satisfied that the experiment was a good one. There were but two subjects, and both had had much experience with this kind of work in the psychological laboratory.

Coover and Angell (2 : 328 f.) report two experiments, one of which is on sense-discrimination: —

Four reagents were trained in discrimination of intensities of *sound* for seventeen days during an interval of fifty-seven days. Each reagent made forty judgments in each day's sitting.

Before and after training the reagents were tested in the discrimination of shades of gray, each test consisting of three series, each containing thirty-five judgments, delivered on three separate days.

Our conclusion from the experiment . . . is that efficiency of sensible discrimination acquired by training with sound stimuli has been transferred to the efficiency of discriminating brightness stimuli, and that the factors in this transfer are due in great part to habituation and to a more economic adaptation of attention, *i. e.*, are general rather than special in character.

It should be said in passing that according to the data submitted, the amount of transfer was so small as to be left in doubt.

Some of Thorndike and Woodworth's experiments also bear on sense-discrimination, and while some show a transfer of practice, others do not.

Memory. A number of experiments have been performed on the transfer of practice in memorizing from one kind of material to another. The experiment cited above from James is one. Another, made in the same manner, but with more varied material and only two subjects, is reported by Bennett (pp. 45–46). In this experiment considerable improvement in memorizing was manifest after the practice series.

Ebert and Meuman carried on an experiment by the "test method," in which they measured the increased efficiency of the memories for letters, numbers, nonsense syllables, words (vernacular), Italian words,

poetry, and prose. Between the tests the subjects were trained on meaningless syllables.

The experimenters conclude that "it may not be denied, when the facts are taken into consideration, that there is a general memory training, also that it is out of the question to increase through practice any special memory isolated from the totality of memory function." [1]

Winch reports an experiment made on some schoolchildren in Great Britain. "Tests were made by learning selections from an historical reader; the training consisted in committing poetry and selections from a geographical reader." The ability of the children who had taken the test was compared with some who had not taken it. "It was found that the children who had had the special practice averaged nearly ten per cent better than those without training." [2]

Fracker reports an experimental investigation on the transference of training in memory in the "University of Iowa Studies in Psychology" for June, 1908. The experiments were carried on by the "test method." Eight persons took both the test and the practice series, while four others took the test series only. The training series consisted in practice in memory for the order of four tones. The test series consisted of eight experiments, as follows: Memory (1) for poetry, (2) for the order of four shades of gray, (3) for the order of nine tones, (4) for the order of nine shades of gray, (5) for four tones, (6) for the order of nine geometrical figures,

[1] From review by Bennett, *loc. cit.*, 33, 34. Original in *Archiv für die gesamte Psychologie*, iv. B., 1904.

[2] From review by Pillsbury, *Educational Review*, xxxvi, 22. Original in *British Journal of Psychology*, xi, 284.

(7) for the order of nine numbers, and (8) for the extent of arm movement. The results obtained are as follows:—

For the four grays there was a difference between the results for the trained and the untrained of 32 per cent, or a gain nine times greater in the trained than in the untrained; for the nine tones, a difference of 10 per cent, or a gain twice as great for the trained as for the untrained; for the nine grays a difference of 9 per cent, or a gain twice as great; for the four tones a difference of 12 per cent; for geometrical figures a difference of 5 per cent; for the nine numbers a gain of 4 per cent; for the movement a difference of 1 per cent; [1] and for poetry a difference of 5 per cent.

The difference of the gain of the trained over the untrained in the tests intentionally similar to the training series is 16 per cent [or 3.7 times as great]. The corresponding difference between the trained and the untrained for tests intentionally dissimilar is 3 per cent [or twice as great].

Fracker compares his results with those of Thorndike and Woodworth, quoted on page 102, and finds them corroborative with but one exception. The exception is that "improvement in many cases is absolutely greater in amount in the tests than in the training," which is contrary to the findings of Thorndike and Woodworth. No satisfactory explanation is offered for this anomaly.

Habits and Ideals. The only experiment so far reported on the transfer of habits is one carried out under

[1] This figure is given by Fracker as −1 per cent, but this appears to be a clerical error. The word "difference" should read "gain" throughout.

the direction of Mrs. C. R. Squire in the public schools at Dillon, Montana, the results of which Bagley summarizes as follows : —

At the Montana State Normal College careful experiments were undertaken to determine whether the habit of producing neat papers in arithmetic will function in reference to neat written work in other studies ; the tests were confined to the intermediate grades. The results are almost startling in their failure to show the slightest improvement in language and spelling papers, although the improvement in the arithmetic papers was noticeable from the very first (4 : 208).

Bagley is especially interested in this experiment because of its bearing on the question of " generalized habits." Such habits he discredits entirely, calling them a psychological absurdity. Every habit is specific, functioning marginally or subconsciously, and so cannot be generalized because of its intrinsic nature. What people have been calling " habits " of industry, obedience, neatness, etc., Bagley maintains are really " ideals." These differ from habits in functioning focally on the plane of judgment instead of marginally and reflexly. Now when a function like neatness is made fully conscious, *i. e.*, when the *ideal* instead of the habit is established, Bagley thinks it can then " be generalized to any extent that one pleases " (4 : 215).

On this point, however, Bagley submits no experimental evidence, arguing only on the basis of common experience and deductive inference. For the purpose of investigating it, the writer had an experiment carried out according to the following directions, which were faithfully observed (25 : 364 f.).

Problem: *Does the ideal of neatness brought out in*

connection with, and applied in, one school subject function in other school subjects?

1. In the written work of one school subject pay all the attention you can both to the habit and the ideal of neatness. Demand neat papers, having them rewritten when necessary.

2. Talk frequently *with* the class (not *to*) on the importance of neatness in dress, business, the home, hospitals, etc., connecting it as far as you can with the subject under experiment. Guard against overdoses.

3. Do *not* bring up the subject of neatness in connection with the other studies of the school. If the pupils refer to these studies, quietly substitute something else. Talk of neatness only in that class, not to the school in general.

4. Collect one or more papers a week in three or four subjects, — language (grammar), arithmetic, geography, history, — one of which is the basis of the experiment. Have name and date on each paper.

5. Collect at least three papers in each subject before you bring up the matter of neatness.

6. Do not let the class know that an experiment is being conducted. Do not alter the work of the school in other respects. If uniform exercise papers are not required now, do not make the requirement.

7. Keep a brief record each day of what was said on neatness, as: March 28. We talked of the importance of neatness in ——.

8. Make specific note of any other changes in neatness you notice in your pupils, in dress, their desks, etc.

9. Carry on the experiment for eight weeks.

Papers were collected in three different schools, all of the seventh grade. The collections were made in the second half of the year, after some degree of stability in

the written work had been attained. The papers were graded on the scale of 100, independently by three different persons. Each grader assigned three grades to each set of papers, — one to those collected before neatness was emphasized, one to those near the middle of the set, and one to those near the end. The grades assigned at each point were then averaged.

The returns from the different schools vary somewhat among themselves, but there seems to be no doubt that neatness made conscious as an ideal or aim in connection with one school subject does function in other subjects. In schools I and III the most marked improvement occurred in geography and in arithmetic, the subjects in which neatness was respectively emphasized, but there was unquestionable improvement also in the other subjects. In school I the average grades in geography showed an improvement of 5 points, and those in arithmetic and grammar respectively 4 and 3.4 points; while in school III arithmetic improved 4.5 points, and geography and history respectively 2.9 and 2 points. The number of pupils showing improvement was about the same in all the subjects. In school II the improvement was in no case very marked, but it is significant that the averages show in no case any decline. If neatness were not mentioned at all for two months, it is more than probable that there would be some deterioration. Hence, if the other subjects had merely held their own, some credit could, no doubt, have been fairly attributed to the leavening influence of the ideal.

Other changes in the neatness of the pupils are hard for the teacher accurately to observe, but one teacher reports three cases of apparently genuine improvement in the care of desks and in personal appearance.

Many other experiments are reported that touch more or less directly on the problem of the transfer of training. These bear on observation, attention, reaction time, cross-education, and general intelligence, and they all quite consistently support the conclusion that one mental function does influence others. The transfer apparently varies directly with the closeness with which the functions compared are related, and it declines rapidly when this relation decreases. The functions of memorizing words and nonsense syllables are much alike, and the transfer of practice from one to the other is marked, but there is little transfer between distinguishing colors and recognizing pitch.

Interference of Training. All the facts brought out so far argue not for an independence and discreteness of mental functions, but for an interdependence and interrelation of such functions. This being true, we should expect not only that one function will assist another somewhat related function, but that under different conditions the first would interfere with the second. This is actually found to be the case. Instead of the transfer of practice being positive, it may be negative. One habit or activity that has become established may interfere with, rather than assist in, the practice or establishment of another habit or activity. The experience of Darwin losing his taste for art and poetry is a case in point. It is proverbial that the specialist in any field has eyes and ears only for his specialty. He *could* no doubt see and hear other things, but his specialty interferes. Among teachers it is a common observation that it is worse for a student to have been taught wrong than not to have been taught at all. A student that has learned to write or sing in bad form experiences great difficulty in

learning to do these acts in good form. He must not only learn, but also break a habit. A number of experiments touching this topic have been reported, and these fully bear out our common experience.[1] A transfer of this kind, while not supporting the original conception of formal discipline, is a transferred influence no less than a positive one.

47. Channels of Transfer. The channels through which improvement is carried from one mental function to another may apparently all be grouped together under the head of "identical elements." [2] This is the means mentioned by Ziller; and Hinsdale, O'Shea, Thorndike, and others also have dwelt upon it. As a means of transfer this is easily comprehensible and removes all mystery from the process. It is, however, frequently difficult to tell when two processes are mentally identical and when they are not. An apparent resemblance or divergence may prove misleading when subjected to test.

Fracker distinguishes between "transference" and "spread of training." He says: "We may mean by transference the ability to use in one act the elements used in another act. If we mean by transference that the training one receives in using a number of elements is transferred to another act in which these elements do not occur, then the phrase 'spread of training' would describe our meaning more accurately. In the sense of 'spread of training' we can hardly say that there is 'transference.' A technical meaning of transference is answered only by the first definition." [3] Both means of

[1] Bergström, *American Journal of Psychology*, vi, 433. Judd, *Educational Review*, xxxvi, 28. See also Henderson, *Education*, xxix, 601.

[2] The phrase "similar elements" would on the whole be better.

[3] *University of Iowa Studies in Psychology*, June, 1908, p. 85.

improvement, Fracker finds, are, on the subjective side, mediated by systems of imagery.

Identical elements have been classified farther by Thorndike (76 : 243) under the sub-classes of "identity of substance" and "identity of procedure." Subjects that have a part of their substance or content in common can scarcely help being mutually beneficial. A thorough training in mathematics will make physics easier because physics is largely mathematics; and the person who knows Latin and German will have many of the difficulties in learning Esperanto removed because he already has the pronunciation and most of the root-words. Still, we must always be cautious about expecting too much assistance in this way, for different subjects are more different than alike, and the transfer never seems to take place at par.

In a similar manner the student who has learned the method of procedure in studying one subject, who has gained the *concept of method*, will be benefited in studying another where a similar method is used. The student of languages in time acquires a mode of attack that he uses in all language-study, and the person who has had a laboratory course in physics can later apply many of the methods he has learned in the laboratory work in chemistry, psychology, and other sciences. This is the element to which Coover and Angell attribute the transfer of practice in their experiments; and most, if not all, of the transfer in the memory experiments may be explained by means of it.

According to Thorndike, these two species of identical elements embrace all the cases. Everything that does not come under identity of substance, and whose influence can possibly spread, is classed under identity of proced-

ure. But this does not seem quite adequate. Where, for example, should such functions as "obedience" and "self-reliance" be placed? Thorndike mentions these as identical elements that function in different situations, but he does not classify them further. Strictly speaking, however, these elements come neither under the head of identity of substance, which has objective reference pure and simple, nor under the head of identity of procedure, or method (the preferable term), which has reference to rules for manipulating the objective. In so far as they are not merely habitual or instinctive, they exist in the mind as standards or ideals that serve as models or aims for activity. Their reference is primarily subjective, although in the nature of the case they can be realized only in the concrete. They function as identical elements in different situations, it is true, but they do not logically fall into either of the sub-classes mentioned. What we need is a third sub-class, and the writer would suggest for it the name of "identity of aim." This is parallel in phraseology with the others and seems to cover the point.

The experiment on the ideal of neatness described above falls into this class, and so does apparently the whole question of "generalized habits." This has been a disturbing factor in the problem of formal discipline from the beginning. According to psychological analysis and usage, habits are always specific, — they cannot well be anything else, — but according to common observation, certain so-called habits appear unquestionably to be generalized. Such habits are "industry," "perseverance," "self-reliance," and the like.

The cause of the difficulty here is no doubt largely a verbal one. If instead of the word "habits" we should

use the word "ideals," much of the difficulty would disappear. Where such a function as perseverance is generalized, it is done so partly at least through conscious control, which places it in the second category rather than the first.

Another factor which enters here, and which appears to be large in many instances, is that of native capacity. A person with a capacity for industry, perseverance, or self-reliance is likely to manifest that capacity in whatever he undertakes. If now this capacity be especially awakened in a particular study, and it then naturally functions elsewhere, it is wrongly inferred that it has become a generalized habit. That people differ in their native capacity in these respects is evident to all, and is unquestioned by psychologists.

But there is no doubt still a third factor that enters here. Habit and judgment cannot be sharply divided, but they hold a relation to each other like that of two triangles placed so as to form a rectangle. They may both be present in the same reaction, but as one increases the other decreases. Habit is thus not necessarily confined to situations that are identical in all respects, but it may operate in response to similar elements in otherwise different situations. Some conscious guidance is probably used in selecting the similar element, but even this may be reduced to a minimum. Hence a function like perseverance may actually be more on the plane of habit than on the plane of judgment, even when acquired. This makes classification difficult, if not impossible, and so is no doubt at the bottom of some of the confusion that exists.

48. Conclusion and Applications. If we have analyzed the doctrine of formal discipline correctly, it is evi-

dent that its extreme advocates and its extreme opponents are both wrong. Knowledge and training are not merely specific in their application, but they also have a general value. This value arises through the factor of identical elements, of which there are at least three types,[1] and it declines rapidly as the similarity of the material of instruction or training decreases. Because of this rapid decline we can conclude that this doctrine is valueless as a criterion for the selection of subject-matter. To defend or retain a subject on the basis of its disciplinary effect is to take a stand on an extremely slender support. Only intrinsic values serve as valid bases for such retention and defense. But after a subject has once been admitted on this basis, the formal values that exist should be given their full emphasis. This means no more than to say that the subjects should be taught as well as we know how to teach them. No subject has a supreme or peculiar value in developing methods of procedure or ideals that are of universal application, but all subjects may be so taught as to yield their quota in these respects; and it is to be especially emphasized that we get little of these formal values without aiming definitely for them. The general relations of aim, method, and content must be brought definitely and attractively to consciousness, and applied to the activities at hand. Only in this way can we make sure that these values will to a certain extent be generalized; and they will in addition vitalize our teaching. In teaching we can expect to reap no more than we sow, for the law of compensation operates in the realm of mind no less than elsewhere. Results in mental training follow surely only upon the expenditure of definite and

[1] See chapter ix.

intelligent effort, but with this they seem everywhere commensurate.

EXERCISES

1. Does the theory of identical elements apply to interference of training?

2. Do the conclusions of the text in regard to formal discipline apply to the doctrine of unfoldment?

3. Can you mention a desirable subject of study that must be defended primarily on its disciplinary value?

4. Give three instances of transfer through identity of substance; through identity of method; through identity of aim.

5. Is Delabarre right when he says: "The formula of identical elements is true, but of no real practical use"? In answering, consider its rationalizing value.

6. Criticise: "Our first reason for the study of science rests on the training in observation for which it furnishes the opportunity."

"The second reason for the study of science is that it trains the pupil in the organization of his observations by comparison and induction" (69 : 8, 9).

7. Criticise: "Milo, the athlete, as Quintilian affirms, by lifting a calf day after day, was, in the end, able to lift an ox. Mind and muscle agree in this fact that, by being taxed, they acquire new power and skill, and this is what we mean by discipline" (62 : 149).

8. Criticise: In speaking of logic John Stuart Mill says: "I know of nothing in my education to which I think myself more indebted for whatever capacity of thinking I have attained. . . . I am persuaded that nothing in modern education tends so much when properly used to form exact thinkers, who attach a precise meaning to words and propositions and are not imposed on by vague, loose, or ambiguous terms."

9. Is Bacon more right than wrong, or *vice versa*? "Histories make men wise, poets witty; the mathematics, subtile;

natural philosophy, deep; moral, grave; logic and rhetoric, able to contend. Studies terminate in manners. Nay, there is no stond or impediment in the wit but may be wrought out by fit studies, like as diseases of the body may have appropriate exercises. . . . So every defect of the mind may have a special receipt."

10. Do you approve of the following? Why, or why not? "That a student has a marked predilection for a certain study is proof that his mind is a facile instrument in one main line of activity, and may be a valid reason why he should be excused from this intellectual pursuit; while marked unsuccess in another study indicates a dormant or undeveloped faculty, and may be a valid reason why the study should be maintained, even under painful pressure" (62 : 152).

COLLATERAL READING

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CHAPTER VII

THE ELEMENTAL EDUCATIONAL VALUES

(A) *Instrumental Values*

49. Need of Further Analysis. Our aim so far has been to set forth the end of education only in a general way. We have defined education as the process of adjusting the individual to the conditions of modern human life, this life to be understood both in its subjective and objective aspects; and we have pointed out that adjustment meant on the one hand added appreciation of, increased harmony with, and intelligent control over, one's environment, and on the other the power of continued growth and the ability to make efficient and proper use of one's own capacities. This implies in a general way that only such studies and exercises should be taken into the school as distinctly further the adjustment process, but we manifestly need more definite criteria for the evaluation and selection of studies than our analysis has thus far revealed. We need to know what the educational values are in their lowest terms, and how these values are met by the studies and exercises of the school. Man's life is varied and complex, and one cannot expect that every study will put man in touch with it equally in all directions. A single study has but a few conspicuous values, — frequently but one that leads, with several that are subordinate. The leading values are furthermore in a degree characteristic for

each study, so that we get as many values as we have studies. But relationships between the values of studies do exist, and the problem that now faces us is to resolve these values into a few logically exclusive classes. In doing this it should not be expected that absolutely distinct dividing lines will be drawn, for such lines probably nowhere exist. The various values shade into one another like the different colors of the rainbow, but the different types of values may nevertheless be distinctly identified.

50. Preparatory and Introductory Values. In relation to other subjects of study, practically every subject may be regarded as having a preparatory value. Reading, writing, and number open the gateway to all the studies that follow. Arithmetic prepares for algebra, geography for history, and history for literature. Physics and astronomy cannot be intensively pursued without a good deal of mathematics; while the biological sciences presuppose physics and chemistry, and are also beginning more and more to presuppose mathematics. In chapter i we saw that the various professional studies for teaching are not only progressively dependent on one another, but are also dependent on psychology, biology, and other academic studies. One value, then, that a study may have, is the *preparatory*.

The characteristic feature of a preparatory value is that the substance of one study is used as such in the pursuit of another study. Mathematics is used as mathematics in physics, and chemistry as chemistry in physiology. But there is another value that is sometimes identified with the preparatory that does not conform to this criterion. It may be illustrated by physical geography in the high school, which is said to be prepara-

tory to the study of the sciences. It is not said, however, that physical geography necessarily yields geographical facts and principles that are needed in the pursuit of the sciences, but rather that a little of botany, zoölogy, physics, chemistry, and astronomy is actually studied in geography. What physical geography does here is to *introduce* the study of a number of the sciences, and for that reason its value in relation to the sciences should be called *introductory* instead of preparatory.

Some studies occasionally have the introductory value, but it is characteristic of only a few. Physical geography forms a good example, but the value is a subordinate one and is apparently seldom realized. In the field of literature this value is perhaps more often used than elsewhere, and this should no doubt be done even more than it now is. The tales of King Arthur are sometimes read in prose form for the avowed purpose of leading up to the study of the "Idylls of the King" by Tennyson, and Lamb's "Tales from Shakespeare" are in some places similarly used as an introduction to Shakespeare's plays. In history a brief account of a period or epoch may be used to lay the basis for a more exhaustive study later, especially in private reading. College courses in biology, psychology, economics, etc., are frequently called "introductory" because of this very feature. Such courses take it as one of their aims to give a student a broad and general acquaintance with the entire subject, for the purpose, among others, of leading up to narrower and more intensive study later. It is to be expressly borne in mind, however, that other values are not excluded by this one. An introductory course may be taken entirely irrespective of its introductory value.

The preparatory and introductory values both rise out of the psychological principle of apperception. Experience can be interpreted only in the light of previous experience; and when certain data depend for their interpretation and comprehension on other data, these data should be given priority in the school. This is the preparatory relation. It is also true that a person cannot grasp and retain a host of details unless he knows in a schematic way what they are all about; unless he has an outline knowledge of the field so that he can properly assimilate or pigeon-hole the details. This is the introductory relation.

These two values apply mainly to the schoolroom, and not to life in general. They must be understood as referring to the interrelations of studies themselves, and not to the application of studies to vocational and avocational problems. To say, for example, that a study is preparatory because it prepares for life, would be to forestall our attempt at classification, because it would land us just where we started. In this sense the word "preparatory" would be just as broad in meaning as the word "adjustment."

51. The Practical Value. The values of studies that we are most interested in as educators rather than as teachers are those that pertain primarily to life outside the school, and it is to these that we now turn. One of these values is the *practical*. This word we must again use in a narrow, technical sense, for in a broad way everything is practical. It must be used as having reference to the securing of *protection*, *food*, *clothing*, *shelter*, *communication*, and *locomotion*. It corresponds roughly to Spencer's categories of direct and indirect self-preservation and to Bagley's utilitarian value.

The practical value may be conveniently subdivided into two groups — the *individually practical* and the *socially practical*. In the former the individual receives protection and material gain *directly* through the application of knowledge that he makes for himself; while in the latter the individual gains these things *indirectly* through public, semi-public, and professional initiative. The first may be illustrated by a person using his knowledge of bacteria in preserving his own health, and the second by the individual gaining the benefit of this knowledge through the services of a physician or through municipal sanitary undertakings.

The first factor, protection, is taken care of directly, largely by instinct and by the knowledge and skill acquired before school-life begins and outside of school-hours. The capacities and sensations of fear, hunger, thirst, fatigue, etc., which do not need to be implanted, although they need to be guided, and the skill spontaneously acquired on the playground, — skill in running, striking, dodging, balancing, — go far in protecting the body from harm and destruction throughout life. But knowledge may also lend its quota of assistance in this respect. Bacteriology, physiology, and hygiene further the care of the body by revealing certain needs and dangers of which otherwise we would not be aware; and a scientific knowledge of electricity may keep one from touching a dangerous live wire. Other instances will no doubt readily occur to the reader.

Indirect protection is also in a measure gained instinctively when, for example, parents and others protect us from impending danger in response to the altruistic impulse; but in the main this gain comes from

the application of knowledge. It comes to the individual through the callings and enterprises that are based upon school acquirements. The knowledge and training possessed by the lawyer, the physician, the engineer, and the chemist are at the disposal of every man, woman, and child. The benefit comes to them whenever they ask for and receive professional services that are of a protective nature, as well as through such public regulations as those pertaining to sanitation, quarantine, police protection, and the lighting of streets.

The securing of food, clothing, and shelter may be considered together under the head of gaining a livelihood. While some gain these elements, at least in part, directly from the soil, fibers, quarries, mines, and forests, others gain them in the main indirectly by means of money earned in other ways. Science and technical knowledge may be of assistance to both classes, but here again the knowledge gained from general experience is of great importance, though less than in the preceding item. The farmer, stockman, and gardener may make their work more remunerative through a knowledge of botany, zoölogy, and scientific agriculture, and the merchant may realize in cash on his knowledge of geography, economics, and psychology. The woman in the home may gain practical help from courses in domestic science and domestic art, which are based directly on chemistry, physiology, æsthetics, and other sciences. Reading, writing, and arithmetic are used in their daily work by nearly all people.

The members of the technical professions, such as law, medicine, engineering, and teaching, are obviously directly dependent on academic training for their livelihood. Their knowledge and skill, acquired largely in

liberal and technical schools, is their invested capital. We are here obviously dealing with a phase of vocational education, but this should not bar it from serious and impartial consideration, not even if the individuals who received the training were the only ones to profit by it in any conspicuous degree. Educational theory that draws the line at social benefit, leaving the individual to himself the moment he does not give adequate return to others, rests on a selfish basis merely, and so does not measure up to educational theory at its best. Professional training, however, is not individualistic only, but has a social side fully equal in importance to the individualistic side. As in the case of protection, this training is again at the disposal of others who may profit by it indirectly, both through professional services and through the social influences of public and corporate enterprises that are guided by professional hands. Whether we get dividends from railroad, telegraph, and telephone lines or not, we reap the benefit of the engineer's training every time we take a trip, or send or receive a parcel, a letter, or a message; and the social effects of the other professions are no less evident. The men who give these services receive their fees or salaries, it is true, but they give enough in return to net a profit for the client as well.

Among the sources of practical benefit that spring from public initiative may be mentioned the judicial, executive, and legislative offices, and state and municipal sanitary undertakings. In a society organized like ours, the individual can indeed do something in applying the teachings of bacteriology and hygiene to himself, but this must ever be supplemented by public enterprise to be of much avail. Sewage-disposal, purifi-

cation of water-supply, control of contagious diseases, and other sanitary precautions cannot be left to the individual to be generally effective. But by public effort the revelations of science are made to do service for all through their appointed experts, and the dissemination of scientific knowledge goes far in initiating public effort and making it effective.

History, economics, sociology, and political science are made effective for society largely through its legislators and executive and judicial officers. In addition to integrity of purpose, wise legislation and the just execution and interpretation of the laws are in no small degree dependent upon a knowledge of the country's past, and upon the economic and social principles on which society rests. Without them law-making would be left to caprice and blind experimentation, and the executive and judicial officers would lack many fundamental principles of guidance. The general dissemination of this knowledge again furthers the efforts of the officials and makes possible intelligent voting.

The practical value has reference to the function that studies serve in meeting our physical needs and conveniences. No reference to anything beyond is involved. Knowledge of a subject and the application of this knowledge are the only steps concerned. But this is clearly not the only way in which knowledge may benefit humanity. Indeed, by some the practical value, especially when it takes the vocational bent, is scarcely admitted to the rank of an "educative" value. This term they would reserve for something more subtile and refined. But be that as it may, there unquestionably are a number of other values of which the teacher needs to be definitely aware.

52. The Socializing Value. Knowledge may benefit society through changing the disposition or attitude of the person who receives the knowledge. In connection with public health and political life we noted briefly that a general dissemination of the knowledge involved is a significant factor in furthering the efforts of the experts and officials. A person who understands the nature and dangers of bacteria will not oppose expenditure for a sanitary water-supply or stand in the way of enforcing quarantine regulations. He is far more likely to give his generous support. Knowledge tends to enlist the sympathy and coöperation of people in all worthy efforts, even though this knowledge is applied by others, while ignorance is a foe, or at best a dead weight, against change or improvement of all kinds. This tendency of knowledge to change the attitude of people is distinctly social and may be called its *socializing value*. It has reference to the gain in responsiveness, good will, coöperation, toleration, and integrity that the possession of knowledge tends to produce.

Social insight gives rise to social sympathy and moral support that may touch every activity in which men engage. We are all so constituted as to crave the appreciation and the good will of others. But people can give these only when they have knowledge, and under the present differentiation of industry they are likely to remain comparatively ignorant of all industries except their own. The school through knowledge and training must supply what social progress has otherwise precluded. The child with his little garden plot on the school campus has opened up to him by intelligent teaching the entire vocation of the farmer, especially if the school instruction is wisely supplemented by country excursions, and

he can ever after coöperate intelligently and sympathetically with all that pertains to the farmer's life.

What is true for farming is correspondingly true for every other vocation. Manual or industrial training as an educative subject finds here one of its chief supports. It gives social insight in a number of directions, and through this, social sympathy and coöperation. It leads to a mutual understanding and appreciation between the various industrial classes. Geography gives a similar insight from the more purely intellectual standpoint, and it does this not only for most of the fundamental human activities, but also for the life of other nations and peoples, especially when supplemented by books of travel. The novel does the same from a different angle still, and adds to this the life of the various social strata. In fact, no content study is entirely without this value.

Closely connected with social sympathy is the sentiment of toleration. This sentiment is manifested particularly in political and religious directions, where it may be fostered by school studies in no slight degree. History, by giving impartial expositions of past political conflicts, leads the student to appreciate the fact that the leaders on both sides may be equally sincere and equally solicitous for the public welfare. Not having his own interests involved, he is put in a fair way to give the members of the opposing parties in his own time credit for sincerity of purpose, and even to extend to them his good will.

Religious narrowness and strife have steadily declined with the advance of knowledge. History and psychology both reveal that man must have positive convictions regarding the verities of life and existence in order to give him stability of character. But in the light of psycho-

logy, anthropology, and the comparative study of peoples and religions, both geographically and historically, it becomes evident that these convictions need not be identical for all. It becomes evident to the student that God has favored all nations and all individuals in his own peculiar way, and he has been absent from none. What we believe is a function of both tradition and knowledge, and both anthropological and historical study reveal the fact that knowledge is ever becoming an increasing factor in determining our beliefs. People believe according to their natures, their traditions, their training, and the light they have, and a genuine realization of this fact as obtained through study is attended by far-reaching charity. The physical and biological sciences also contribute a large element to this tolerant spirit. Think for a moment of the softening influence that the spread of a genuine knowledge of the doctrine of evolution is producing.

53. **The Moral Value.** These various elements of the socializing value might also be classified under the general heading of *moral*[1] value. While the words "moral" and "social" are not strictly synonymous, there is no logical demarcation between them. A moral value, narrowly considered, is always a species of social value. In conventional usage, however, the word "moral" is restricted to the injunctions of the Decalogue, and it is in this sense that we shall use it.

While our moral convictions and habits are most vitally influenced by the home, the church, the personality of the teacher, and our daily associates, certain school studies are also not without their moral effect. Merely keeping people occupied along worthy lines,

[1] For a discussion of the meaning of this word see pp. 63–65 above.

thus establishing worthy habits and removing time and opportunity for baser pursuits, is a moral result. Much is usually claimed for the moulding influence of the characters portrayed in history and literature. These characters, from fact and from fiction, give embodiments of the noble as well as the base, together with the resulting consequences, and so may be taken as models, as well as revolting warnings, by the student. To what extent this is actually done has never been measured, but marked instances of moral inspiration and uplift received from these sources are comparatively frequent, indicating that less marked instances are common.

Civil government is another subject whose possibilities in this direction are large. It is in this subject that the student may be most directly impressed with his duty concerning voting, the payment of taxes, attendance upon caucuses and meetings, and political life in general. This may be done with special effectiveness by making skillful use of the student's own activities in athletic clubs and in debating and literary societies. Advantage of this opportunity is being taken by the recent "School City" movement.

54. The Conventional Value. In addition to being practical and to having a socializing effect, knowledge serves also to give a community of ideas for social intercourse. Social life needs a common basis both to cement it together and to make it enjoyable, and to the extent that knowledge supplies this basis it has a *conventional value*. But as there are lines of cleavage in society, this value does not consist merely in a common thought life, but also in standards that all of a certain social group are expected to meet. These groups are inherently jealous of their membership, and in order to

be admitted, a person must show outward signs of fitness. In England at the time of Locke, for example, it was expected of a "gentleman" to have studied both Latin and French, and there are a number of elements of knowledge in the curriculum now that are demanded largely, if not primarily, for conventional reasons.

The *raison d'être* of the conventional value as it is generally used is not always easy to see. The value is a complex one and has to be analyzed to be understood. A fundamental instinct involved in it is that of æsthetic appreciation. It is this that accounts in part at least for the perfection that is demanded in pronunciation, grammatical construction, and similar elements, and for the fact that knowledge is frequently used as a means of ornament. But the main factor involved in this value is apparently the index factor. The knowledge demanded for conventional reasons is not necessarily valued for itself, but is taken by others as an index of our breeding and culture, while by the individual it may conversely be used as a means of display and of gaining social prestige, thus involving the instincts of approbation and rivalry. Such knowledge serves as an earmark of the culture and thoroughness demanded as a common basis for social intercourse, and while we are apparently approved or condemned by it directly, judgment is really passed on what it signifies; or this is at least as it normally should be. The knowledge is analogous to style in attire and other conventions of refined society which, in addition to being æsthetic, stand, or normally should stand, for much more than surface indications.

Among the things that are valued for conventional reasons may be mentioned grammatically correct English,

correct pronunciation, correct spelling, some knowledge of the great literary masterpieces, the fundamental facts of history and geography, and many mathematical and scientific facts and expressions. Latin, French, art, music, and to some extent literature are frequently studied primarily for conventional or ornamental purposes. They are wanted for the sake of appearance and effect rather than for culture and usefulness, and when this is largely the case, the student's course may be criticised. This raises the question of the extent to which the conventional value is a legitimate value at all in education. Spencer, using the word "ornamental," in the sense of "display," in designating the value, condemned it entirely. He would have it displaced by the practical and socializing values, which, as he saw it, would make marked modifications in the curriculum. He attacked especially Latin, French, German, and the "accomplishments" of dancing, deportment, the piano, singing, and drawing, which were usurping the time of more useful subjects, such as physiology, psychology, and the sciences generally.

The standing of the conventional value becomes clear when we recognize that it is a *secondary*, and not a primary value. Its demands can be legitimately enforced only in regard to subjects that are needed in life for one or more of the other intrinsic values. Trouble arises only when its demands are enforced in regard to subjects that are obsolescent, or that have actually become obsolete, or whenever it is allowed to assume a primary instead of a secondary position. All the subjects mentioned above in illustration of the conventional value are demanded in life by the practical, socializing, and cultural values, and only these values can determine the proper

place of these subjects in the curriculum. But when this place has once been determined, the conventional motive may step in and reinforce the demands for their acquisition, and for accuracy and thoroughness in them. It should, however, not magnify certain subjects beyond their real significance, as is still unquestionably being done in some places. In Spencer's time this was apparently done beyond all bounds of reason, and his criticism was sorely needed. But this tendency is now on the decline, especially in American public education, where the merely conventional and ornamental has little chance.

55. Meaning of "Social Value." In the last few years we have heard unusually much about the social aim of education and the social value of studies, but just what is meant by these phrases has never been clearly defined. The word "social" has become a shibboleth in the mouths of many and, while they have had a more or less vague notion of social benefit, composed more of feeling than of clearly defined thought, it has seldom, if ever, occurred to them to inquire into its precise meaning. The truth is that the expression "social value" does not stand for a simple concept that may be immediately apprehended, but for a complex idea that must be analyzed to be adequately understood. The values that are included in it are, first, the one that we have termed the socializing value; second, the moral value; third, the socially practical value; and fourth, the conventional value. All four of these are distinctly social in their bearing, but they are too heterogeneous to be indiscriminately lumped together. Furthermore, while the importance of these values, especially of the first three, is not questioned, it should be recognized that the aim of education cannot be restricted to them. Such restriction would fail to include

some of the legitimate spheres of educational activity, and would theoretically subordinate the individual to the group in a manner that is contrary to fact. Education must prepare for individual happiness as well as for social usefulness, a proposition that the discussion of the culture values in the next chapter should establish.

CHAPTER VIII

THE ELEMENTAL EDUCATIONAL VALUES

(B) *Cultural Values*

56. **Instrumental and Cultural Values Distinguished.** The preparatory, introductory, practical, socializing, and conventional values may all be grouped together under the head of *instrumental values*. Viewed from this standpoint, studies are not appreciated directly, but they are appreciated for what may be done with them. They serve as instruments for achieving the various purposes of life, similar to the way in which mechanical tools and machinery serve as such instruments. The preparatory and introductory values help in other studies, the practical value helps in utilitarian ways, the socializing value is a means to social and moral responsiveness, and the conventional value assists in social intercourse. But studies may also be appreciated directly, regardless of any ulterior benefits that they may bring. This is in a measure true of all studies, but it is especially evident in literature and the fine arts. These studies are valued largely or chiefly for the pleasure that their perusal affords, quite aside from the instrumental values that they may also possess. To the extent in which studies may be directly appreciated they are said to have a *cultural value*.

57. **Recognition and Terminology.** The capacity of studies to yield intellectual and æsthetic enjoyment has

long been recognized in educational and philosophical writings. This capacity held a peculiarly high place in the minds of the Athenian philosophers, and it has never lacked eloquent and appreciative advocates wherever mental culture has been approved or has flourished. But in spite of its age and importance, there is still little agreement as to the best name that should be applied to this value, or as to the sense in which the word "cultural" should be used. Of this fact the student of education should be apprised because it may save him much perplexity in his reading. Spencer does not name this value at all, but refers to it merely as "Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings" (70 : 32). Bagley, following a certain psychological usage, calls it the "sentimental value" because of the appeal that it makes to the sentiments or higher feelings. The word "cultural" Bagley uses as synonymous with "conventional," especially conventional in the extreme and objectionable sense (cp. 4 : 48 and 230) ; while D. E. Smith, in his "Teaching of Elementary Mathematics," uses "cultural" as synonymous with "disciplinary." Dewey defines "culture" as "the vital union of information and discipline" (16 : 19), thus making it as broad as the word "educative."

Because of this confusion, some have advocated the disuse of the word "cultural" entirely in educational literature. They claim it is used so loosely and is withal so indefinite in meaning that it only hampers the progress of educational science. That there is some truth in this contention cannot be denied, but the best way out is not by discarding the word entirely, but by rescuing it from its indefiniteness. The word has become

so firmly intrenched in our educational vocabulary that it would be impossible to eradicate it, even if that were desirable. In the popular mind the word is apparently always taken to refer to the higher intellectual and æsthetic pleasures, and it is also used in this sense most frequently by educators. Horne defines "culture" as "the capacity for the intellectual and æsthetic enjoyment of leisure" (37 : 34), and W. H. Payne adopts the same meaning by applying the word to those uses of studies that "serve for delight" (62 : 161); but too many educational writers, whether they use the word in this sense or not, are careless about telling us just what they do mean by it. They use it as a blanket word covering almost anything in educational values, and it is evident from the context that the thought they have back of the word is no more definite than the use they make of the word.

58. The Cultural Value Analyzed. The main cause of the difficulty with the word "cultural" undoubtedly lies in the fact that the ramifications of its meaning have never been clearly traced out and defined. The concept to which it is applied is generic instead of specific, and so has to be analyzed. Even when restricted to "intellectual and æsthetic enjoyment," we have included in it still a number of values that in the interest of clearness must be distinguished. The intellectual and the æsthetic activities of our minds are not sufficiently alike to be indiscriminately classed together. We should make here at least two values, which we may call respectively the *liberalizing* and the *sentimental*. The latter applies to the pleasure that results from the exercise that studies give to the feelings, and the former applies to the pleasure that accompanies intellectual insight The

liberalizing value may be illustrated by the pleasure and attitude resulting from the insight into natural phenomena given by physics or astronomy, and the sentimental by the enjoyment of a picture, a piece of music, or a poem.

Both of these aspects of the cultural value arise from the biological fact that the proper exercise of any function or capacity yields pleasure. This applies not only to man, but to the lower animals as well. It is at the root of the universal tendency to play. Given a capacity, an animal will instinctively seek to exercise it, if not in seriousness, then in fun. The serious motive leads to individual and to race preservation, and the other to the phenomenon we call "play." Man possesses the power to walk so as to be able to move readily from place to place, but he takes many a stroll for pleasure. He can talk for the sake of communicating information, but he by no means restricts the capacity to this function. The capacities of intellect and feeling are subject to the same rule. Man craves something to occupy both his body and his mind.

Phylogenetically, this tendency to play, using the word in a very broad sense, has no doubt been selected because of its survival value. An animal that plays has at least four advantages over one that does not. It gets training in a useful function, it gets physical exercise, it is led to useful discoveries through the indulgence of curiosity, and, when we come to man at least, it gets mental as well as physical relaxation. All these are aids to health and efficiency, and so to biological survival. But these benefits seldom form the immediate motive for playful indulgence, not even when we come to the reflective life of man. The immediate motive usually is

the pleasure that the activity itself affords. This is not strange, for ultimately we live only in conscious experiences, and it is these that we are seeking. Life is rich or poor according to the wealth or poverty of these experiences. This makes the culture values, which in the main are but play values refined and humanized, the most fundamental values of all. The other values may be looked upon as relative to them, for in the end they are all valued because they contribute to desired experiences. Their instrumental nature thus becomes again evident.

But the play activities, in which music, art, and literature are included, are not the only activities that yield enjoyment. Such enjoyment may also be legitimately and abundantly obtained from the pursuit of one's vocation, which makes the sentimental value, and at times the liberalizing value also, apply to the activities involved in one's calling, as well as to the activities involved in the avocational pursuit of literature and art. It is unwise, however, to rely on one's calling for all of one's enjoyment, for one needs variety, both for maximum efficiency and for the maximum satisfaction of life. An avocation is scarcely less essential than a vocation in a life that is to be both objectively and subjectively successful.

59. The Sentimental Value. The sentimental value takes many different forms, as many forms, in fact, as man uses in seeking emotional satisfaction. But for the school these may all be reduced to a few classes. Studies may stimulate the æsthetic sentiment, the comic sentiment, the social sentiment, and the moral sentiment.

The group of sentiments to which the general name of " æsthetic " is applied is appealed to primarily by the

drama, literature, music, painting, sculpture, and architecture. These subjects are valued primarily because of the immediate appeal they make to our feelings of appreciation. They have other values too, especially the conventional and socializing, and through their power to inspire and recuperate they make for greater practical efficiency, but the usual and most immediate object we have in mind when pursuing them is to add to the delight and richness of life. This is the bait that entices us, and the bait is in itself so attractive that the other values seldom need to be drawn upon to enlist our interest.

In connection with literature, and to some extent also with other forms of artistic expression, should be mentioned the sentiment of humor. It is one of a writer's or an artist's legitimate purposes to amuse and to create a laugh. Remove this element from Dickens and from Irving, and one of their chief charms is gone. Mark Twain, Jerome K. Jerome, and other humorists rely upon it as their chief support; and with innumerable other writers it plays a minor, although a significant part. Sculptors and painters use it less than writers, but if we admit ordinary comic pictures, the brush and pencil artists form a close second in this respect to the literary humorists.

Because humor is everywhere a large and delightful element of life, it should have a conspicuous place in the school. The mediæval notion that the school is a solemn place where every one must always be quiet has not yet entirely disappeared. It is the duty of the school, moreover, to cultivate the judgment of humor. This trait is used quite as extensively in life as the sense of the beautiful, and lack of discrimination in it is quite as

offensive. It is amenable to cultivation no less than the æsthetic sense, and is just as likely to remain crude without it. Its cultivation would not have to wean the public from the comic section of the Sunday newspaper, but the quality of that section might be palpably improved thereby.

Another aspect of the sentimental value of literature is the exercise that it gives to the imagination. In both prose and poetry are painted many beautiful word pictures whose enjoyment is much enhanced by picturing them in the mind. Furthermore, it is manifestly impossible for us to experience life in every phase, but through the combination of literature and the imagination we can live in many phases that would otherwise be entirely inaccessible to us. In reading the novel, this life by proxy is frequently the primary motive. But there is much more involved here than the exercise of the imagination. Probably even more fundamental than it are the social feelings. It is the indulgence of these feelings that yields the reader the most pleasure and recreation. He lives with the characters of the book, loving or hating or being indifferent to them scarcely less than if they were real. The moral sentiments may be similarly involved. The reader may get the keenest appreciation from a strong moral situation, and he may have his sympathy touched to the quick.

While the stimulation of all the sentiments is enjoyable, and while the pleasure and relaxation received therefrom may be a sufficient return in the æsthetic and comic sentiments, this is rarely, if ever, the case when it comes to the social and moral sentiments. Here the mere indulgence of the feelings is called "sentimentalism" and is condemned. The fault lies in the fact

that the sentimentalist limits his reactions to feeling, refraining for various reasons from letting this feeling be expressed in action. The person of wealth and leisure may read a novel or go to the theatre and weep over the sufferings from poverty that he sees portrayed, but he may not feel called upon to mitigate a similar condition in his own neighborhood. The propriety of feeling strongly and deeply with the characters in a book or in a play is not questioned, but the matter should not end there. One's energy should not escape merely in sentimental vaporings, but the experience should make one more social and moral. Literature and art may, and usually do, possess the moral and socializing values as well as the sentimental, and when this is the case, these values should be realized. But these two classes of value are not at all incompatible and may be realized together. One may enjoy a novel or play no less, but rather more, for being made more kind and sympathetic through it and having that kindness and sympathy tell in one's life.

Although we have illustrated the sentimental value by reference only to the art subjects, it should not be inferred that this value is restricted to them. It is more central in these subjects than in the others, but it is entirely absent from none. History and philosophy may be appreciated much as literature may, and there are phases of the various sciences that appeal very keenly to the æsthetic sense. These phases may be appreciated no less readily than the æsthetic phases of literature and art. After scientific insight has once been obtained, its results may be enjoyed practically without effort. The heavens with their constellations, the ever shifting planets, the darting meteors, and the

occasional comets are displayed for us every clear night and may be enjoyed by merely looking upward. The person with a knowledge of the plants and flowers has a delightful and diversified companionship along the roadside or in his strolls through the fields and woods; and what applies to botany applies likewise to zoölogy, geology, and mineralogy, and in a measure also to physics and chemistry. Language and mathematics are also not without their æsthetic aspects. We have art wherever we have perfection of system or organization, and this art may be enjoyed by every discerning mind.

60. The Liberalizing Value. The liberalizing value has its root in curiosity, which is one of the instinctive manifestations of mental life. In man this instinct has been developed into a high form of mental activity called the power of rationalization. Man craves not only to know the things in his environment individually, but he is not satisfied until he has resolved them into a consistent system. The working out of the instinct has given us our sciences, as well as our systems of philosophy, and it is ever engaged in raising them to higher degrees of perfection. This organization of knowledge has a practical value, for it makes the knowledge more available and vastly increases and economizes man's control over nature's forces, but this is not the only motive that animates either the student or the investigator. The satisfaction coming from insight into system constitutes in itself a most powerful motive, and it is to this insight and the attitude and satisfaction resulting from it that the term "liberalizing" may be applied.

It has been aptly said that the word "liberal" comes from the root *liber* meaning "free," and not from the

root *liber* meaning "book." Etymologically, therefore, a liberal education is not fundamentally a book education, but an education that sets the mind free. It is an education that is in harmony with the words of Jesus when he said: "Ye shall know the truth, and the truth shall make you free." Such an education gives a person a systematic and truthful acquaintance with the elements of his environment, and so places him in appreciative harmony with them. It sets him literally free, not only mentally, but in a measure also physically, among the phenomena of both nature and society. The person of liberal culture is free to think consistently about the things of science and humanity and he may act with confidence on his conclusions, while the ignorant, prejudiced, or unsystematically trained person is restricted in the range and variety of his mental life and his conduct is made hesitant by uncertainty and fear. His condition is typified by the superstitious attitude of primitive people toward astronomical phenomena. Not understanding these phenomena, they feared them and were in a state of mental and physical bondage to them. But in cultured races this bondage has been entirely removed by the advance of knowledge, and in its place there has been opened a wide and attractive realm to mental life. What is true of astronomy is true also of every other department of knowledge. Studies widen the mental horizon and give a person a positive attitude of freedom toward the world. The word "liberal" in the phrases "liberal education" and "liberal culture" characterizes this aspect of educational influences, and the fact that this aspect is singled out and designated is a tribute to its worth.

The liberalizing value of knowledge may be illustrated

more specifically by reference to teaching. The knowledge of educational theory improves the teaching process and so has a practical value, but this need not be the greatest benefit that it confers. The greatest benefit may lie in the fact that it gives the teacher reasons for doing things that he would otherwise do empirically. A teacher without theory is groping relatively in the dark, and in consequence he feels cramped and uncomfortable in his work, while the knowing teacher is working in the light, and as a result is working with freedom and ease.

As the sentimental value is most characteristic of the art subjects, so the liberalizing value is most characteristic of the sciences. Every science liberates the mind in its own peculiar realm. But this value is not restricted to the sciences. It may be obtained from any subject that is systematically pursued. The condition in which it inheres is system based on fundamental principles. Insight into this system liberates the mind, whether it be in science, art, history, or language. The philologist or the historian gains an appreciation of the law and order that prevails in the universe as well as the physicist or chemist.

The capacity of the sciences to yield both intellectual and æsthetic appreciation has long received full recognition from the scientists, but the devotees of art, literature, and the languages are prone to conclude that the scientist is without those elements of delight in his work that are theirs so abundantly. This is a great mistake. The varied opportunities for achievement and mental activity that the sciences offer give them a fascination second to no other subject. But in all comparisons of this kind it should be recognized that the capacity of a sub-

ject or calling to arouse interest and willing effort is determined primarily by the nature of the person concerned. What is one's meat is another's poison, here as elsewhere. Because a particular line of training and culture has given you a high degree of enjoyment and efficiency, perhaps the most that it was possible for you to obtain, it does not necessarily follow that this line of training and culture is the best for everybody.

61. The Period of Mental Reconstruction. The liberalizing influence of studies is intimately connected with that phase of mental development known as the period of mental reconstruction. The different departments of a child's knowledge are relatively detached from one another, but those of an adult, especially an adult of the reflective type, form a unity. He has his knowledge organized into a system in which everything he knows has a definite place, and into which each new thing learned is promptly fitted. If the new is incongruous with the system, or with any part of it, the system is modified to meet the situation. But some form of system is always maintained in the mind of the reflective adult, and it may properly be said of him that he has a philosophy of life, or of the world.

The transition from an unorganized to a consciously organized mental life is made in all degrees of abruptness. It may occur so gradually that the person concerned is never aware of any change taking place. He may realize on looking back that his point of view has changed and that his mental life has become unified, but he can point to no specific experience that has brought it about. On the other hand, a person may make the transition in a comparatively short space of time, and be keenly conscious of the fact that his mental life is

changing. Between these two extremes lie all possible shades of gradation.

This period of reconstruction is frequently referred to by writers who have themselves consciously experienced it, and some data pertaining to it have been collected by investigators.[1] The writer made this period the subject of an inductive investigation a few years ago and obtained some interesting results.[2] By means of a questionnaire, supplemented by correspondence and personal interviews, he got usable returns from 282 teachers and graduate students. These returns were divided into four classes on the basis of the profoundness of the reconstructive experience. These classes may be briefly described as having experienced transitions (1) that were gradual and unnoticeable, (2) that contained a number of noticeable but slight reconstructions, (3) that contained two or more well-marked reconstructions, and (4) that contained one pronounced reconstruction in which the mental life was consciously unified. The percentages of the whole number falling in these four classes were respectively 23, 34, 22, and 21.

Typical descriptions of actual experiences from each class need not be given at this place, but one illustrative of class four may be inserted. It comes from the life of John Stuart Mill, and is recorded on page 66 of his "Autobiography." He says: —

When I laid down the last volume of the traité [Dumont's "Traité de Legislation," three volumes], I had become a different being. The "principle of utility" understood as Bentham understood it, and applied in the

[1] See for example, Starbuck, *The Psychology of Religion*, chap. xxii.

[2] See Ruediger, "The Period of Mental Reconstruction," *American Journal of Psychology*, July, 1907, pp. 353–370.

manner in which he applied it through these three volumes, fell exactly into its place as the keystone which held together the detached and fragmentary component parts of my knowledge and beliefs. It gave unity to my conception of things. I now had opinions; a creed, a doctrine, a philosophy; in one among the best senses of the word, a religion.

Several other descriptions may be found in the study made by the writer.

Among the data elicited were the causes that were influential in precipitating the reconstructive experience. These are condensed in the following table. The percentages are based upon the entire number of causes mentioned. Of these there were 490 in all, 253 by the men and 237 by the women. Counting only those who mentioned causes, this gives an average of 2.4 per man and 2.5 per woman.

CAUSES	MEN	WOMEN
Personalities	35 per cent	45.4 per cent
Science and Philosophy	33 "	18 "
Psychology	4 "	3.4 "
Literature	5.6 "	8.3 "
Entering College	8.6 "	16.3 "
Joining Church	6 "	2.6 "
Miscellaneous	7.8 "	6 "

In conversation, in letters, and on the returns the statement was frequently made that the items mentioned should not be regarded as sufficient causes, but rather as inciting causes. They precipitated a reconstruction for which the mind had long been getting ready through study and experience. The particular influences served

only to supply a unifying principle for things that were already in the mind, but which had not become integrated. The development is ultimately an educational one, and in its entirety is really always of slow growth.

No evidence appeared in the data that a person's mental life ever becomes integrated and liberalized on the basis of a few studies or profound influences alone. This result appears always to require breadth, as well as thoroughness, of training and experience. Inference from the nature of the reconstructive experience seems to lead to the same conclusion. Psychologically, the heart of this experience is the abstraction and generalization of system. After a number of subjects have been studied, the student begins to see that the system which inheres in one of them is really typical of all. But in order to see this, one subject at least must be known thoroughly or philosophically, and several others must be known in outline so that generalization may be made possible. This makes the period of reconstruction the crowning point of the liberalizing influence of studies, and this is true whether the transition takes place rapidly or slowly.

The difference between people that are conscious of transitions and those that are not seems to be in the main temperamental. In making the study, environmental causes were looked for, but none were evident. The fact seems to be that some of the people in classes one and two are so conservative, or cautious, or reactionary regarding new ideas that they do not adopt them outright, but "get used" to them so gradually that they never really know when they get them, while others reconstruct their mental content whenever they meet a new fact or idea and so experience many scarcely noticeable transitions. The members of classes three and four, on the

other hand, keep on accumulating knowledge without considering its more profound meaning until this is finally forced upon them, and then a marked reconstruction results.

The causes of the transition given in the preceding table reveal a number of sex differences and are otherwise interesting. Personal influences take an extremely high rank, and, as would be expected, count more with women than with men. They form nearly one half the influences mentioned by the women and only about one third of those mentioned by the men. Teachers appear to exert about equal influence over the sexes. They comprise 18 per cent of the items for the men and 21 per cent for the women. This leaves a balance of 17 per cent and 24 per cent for personalities closer than teachers, such as parents, brothers, sisters, and friends, or a ratio of 3 : 2 in favor of the women. Science and philosophy, on the other hand, count more with men than with women, in the ratio of nearly 2 : 1. The fact that men study these subjects more than women, and therefore are influenced more by them, does not explain away this difference in the figures, but points in the same direction. The reason why men study them more is not so much conventional as it is because they are more attracted to them. Literature is not given as a cause as much more frequently by the women than by the men as might have been expected. But when it is known that Emerson and Browning are the authors most frequently mentioned, this may be accounted for. The writings of these authors might almost as well have been classed with philosophy, for they supply the same kind of unifying principles. Entering college, by which those answering meant either the event of going off to college or the influence of the college

course, appears decidedly more momentous for women than for men. This is very likely owing to the fact that it forms more of a contrast in their lives than it does in those of the men. Joining church, on the other hand, impresses the men more than the women. The explanation is probably similar to that of the preceding, but it is reversed for the sexes. Boys are more likely than girls to get away from the influence of the church, and so coming back and joining it forms more of a step for them. But whether the reconstructive experience was precipitated by a person, by philosophy, by science, by literature, or by something else, the evidence shows that it was caused by some sort of a synthesizing influence. This would speak for the study of philosophy or the higher relations of science in the latter part of the college course.

The ages at which the transition occurred in class four vary for the men from 14 to 42 years, with an average of 22.2 years and a median of 21 years. 47 per cent of the ages fall between 18 and 22 inclusive, 63 per cent between 18 and 25 inclusive, and $16\frac{2}{3}$ per cent below 18 years. For the women the ages vary from 13 to 32 years, with an average of 20.25 years and a median of 19.5 years. 53 per cent of the ages lie between 18 and 20 inclusive, 70 per cent between 18 and 22, and only 10 per cent fall below 18 years. The men show a greater range of variation than the women and average nearly two years older. This difference agrees well with the difference in the time of the advent of puberty in the two sexes, which indicates that the period of reconstruction is likewise a function of maturity, in part at least.

The average time spent in the transition by the men was 1.6 years and by the women 2.1. The women evi-

dently take a longer time to adjust themselves to new points of view than the men. This is in harmony with the common observation that women are, as a rule, more conservative than men. In the reconstruction, usually long cherished, but now inconsistent, views must be modified or discarded, and although the women are intellectually convinced of the new truths, their feelings linger.

62. Conclusion. In concluding this chapter it should be noted that the cultural values have reference primarily to individual benefit rather than to the benefit of society in general. It is the individual that is liberalized by study or that gains the pleasure from artistic, literary, and scientific knowledge and activity. The many may, and usually do, gain indirectly from the fact that the individual is made more agreeable or efficient because of the pleasure or recreation he has derived, but this is probably not always the case and is not necessary in justifying this value. The enrichment of an individual life may certainly be a sufficient justification, and all fair-minded people who have experienced the delights of culture themselves are pleased to grant these delights to others, even though they themselves may never profit in any way whatsoever. They have cause to interfere only when they are trodden upon; when the individual receiving the pleasure and recreation is made socially worse thereby. He might be made worse directly by having him made less agreeable or less efficient by this element, although this is scarcely conceivable, or indirectly by having it encroach upon the opportunities belonging to the other values. But this does not change the fact that the culture value is primarily individual and only secondarily social, a fact, moreover, that in no wise disparages the concomitant social values. A study

such as history or biology may very well possess both the cultural and the social values, which is no doubt usually the case; but the point here made is that this need not be the case; that these values may and should be logically distinguished and be given separate consideration in evaluating studies or education. This, however, is either not seen, or is usually forgotten by present educators. They remember only the social values and justify or condemn studies on that basis alone. We have here apparently an extreme position of the pedagogical pendulum. The "social" has been, and in a measure still is, a fad in education. The various elements of the social value are indispensable and are bound to retain a high place in education, but it will no doubt also become evident, when the dust clears away, that the individual cannot be wholly subordinated.

The values that we have brought out in the last two chapters may be summarized in the following outline. The moral and the conventional values are purposely indented to show their subordination. The moral value is logically a phase of the socializing value, while the conventional is a secondary value.

- Instrumental
  - Apperceptive
    - Preparatory
    - Introductory
  - Practical
    - Direct, — for the individual
    - Indirect, — for the group
  - Socializing
    - Sympathy
    - Toleration, etc.
    - Moral
      - Integrity
      - Reliability, etc.
    - Conventional
      - Ornamental
      - Index to Culture
- Cultural
  - Sentimental
  - Liberalizing

It is evident that these values are but an elaboration of the three aspects of the meaning of adjustment brought out in chapter iii. We brought out in that chapter that adjustment ultimately means intelligent mastery over one's environment, increased harmony with it, and added appreciation of it. The instrumental values give the intelligent mastery, the liberalizing values give the harmony, and the sentimental values give the appreciation.

EXERCISES

1. How may the sentiment of humor be cultivated?

2. May the intellectual sentiment be distinguished from the liberalizing value?

3. In what way does Spencer's basis of the analysis of educational values (p. 68 above) differ from that of the text?

4. Analyze the educational value of the following subjects: grammar, geography, algebra, German, Latin, astronomy, music.

5. Under what value should the recognition of allusions, such as "Hobson's choice," and "crossing the Rubicon," be classified?

6. On what basis do students elect studies, or courses of study? Can you trace the causes that have operated in your own case?

7. What should be the primary determinant in choosing one's calling in life? What other determinants also exert an influence?

8. In what sense may the phrase "art for art's sake" be legitimately used? Explain these statements: "Virtue is its own reward." "The reward of a good deed is having done it."

9. Discuss: "First and foremost, I should say that Latin is of value because it confers a mastery over the resources of one's mother tongue. . . . Training in English, then, as the

result of careful translation of Latin is here set down as the first and most important reason for studying Latin" (7 : 11).

10. Discuss: "The English training derived from such careful translation as above described seems to me greatly superior to that gained by the usual methods of English composition" (7 : 21).

COLLATERAL READING

Bagley, Educative Process, 225–238.
Hanus, Educational Aims and Educational Values, 3–20.
Payne, Training of Teachers, 155–184.
Spencer, Education, 24–93.

CHAPTER IX

THE ELEMENTAL EDUCATIONAL VALUES

(C) *Formal Values*

63. Content and Formal Values Distinguished. The elemental values of education that were discussed in the two preceding chapters may, in reference to the subject-matter of the curriculum, all be classified as *contentful* rather than formal. Each one involves a direct use of the content of the various studies. The practical value implies material gain or physical comfort through the application of knowledge; the social value implies social sympathy and coöperation through insight based on knowledge; and the culture values imply recreation, entertainment, and mental freedom through the use of knowledge. But these values are not the only ones that knowledge is usually taken to have. Corresponding to the formal aims of education that we discussed in chapters v and vi, knowledge is taken also to have *formal* values in addition to the content or intrinsic values mentioned. These values we shall now examine more closely, although in a measure we have already considered them.

64. The Formal Values. Theoretically, the acquisition of knowledge may exert a formal or general educative influence in at least three ways. It may exert this influence (1) through the factor of identical elements as brought out in chapter vi, (2) through the principle of habit formation, which may modify inherent disposition, and (3) through giving exercise to the brain,

which may have a general tonic effect on the mind through the brain.

The third rubric is the most evident one and should probably not be classed as a formal influence. Still, it is well to bear it clearly in mind, if for no other reason than to keep it from becoming entangled in discussions about formal discipline. Mental power is in many ways analogous to physical strength, if, indeed, it does not follow precisely the same laws throughout. The muscles and the brain are both physical organs, and there is every reason to believe that exercise affects both in a similar manner. An unexercised brain deteriorates just like an unexercised muscle, and proper exercise acts as a tonic to each. This exercise may not change native capacity, but it is nevertheless indispensable in keeping this capacity at its maximum efficiency, and through the health that it imparts its influence is in a degree at least general. This influence is probably most vitally exerted in the course of development from infancy to maturity. There seems to be no question that maximum physical development cannot be obtained without proper physical exercise, and if this exercise is omitted during any considerable part of the growing period, the loss that results therefrom cannot be fully regained later. If a similar condition holds for the brain, and there is no reason to doubt that it does, a proper amount of brain exercise obtained through study during the growing period is an indispensable factor in bringing the adult brain to its maximum efficiency. What amount of such exercise is a "proper" amount is a problem for the genetic psychologist to determine, but the specialization of the mental powers leaves no doubt of the fact that this exercise should be varied.

The second rubric, the one pertaining to the modification of disposition through habit formation, bears the closest resemblance to the traditional conception of formal culture. It used to be thought that study added directly to the fund of intellectual and moral power, and that this gain of power would remain even after all that had been learned was forgotten. The analysis we made in chapter vi shows that this conception is precluded by scientific psychology, but a result very similar to this is obtained through the factor of training in education. As the twig is bent, the tree is inclined. We know that a horse or a dog may be spoilt by the way he is trained, and the spoilt child is a proverbial example of what training may or may not do. The person drilled from infancy in the little niceties of deportment has these niceties ingrained into his very nature and uses them easily and gracefully throughout life, while the child who was not so fortunate in his training has difficulty ever to make them his own, even though his later environment would require them. The mechanizations involved in habitually correct speech, correct spelling, the knowledge of arithmetical tables, the trained voice, and the motor skill of the musician are all examples of the modification of disposition resulting from education. But this influence need not be restricted to these physical and relatively low activities. An environment conducive to kind and cheerful thoughts tends to make these thoughts habitual and to allow the opposite tendency to atrophy. Vicious tendencies may be weakened by curtailing their expression and by supplanting them with nobler activities. Indeed, no effort put forth in study can be without some effect of this kind. The identical elements of method and of

aim, when used much, may also become largely habitual, and when this is the case, their influence falls under this head. Any mental function that is exercised becomes ingrained and is ever more readily exercised, while one that is not exercised tends to die out.

65. Relation of Form and Content Values. The nature of the generalized influence of studies through the identical elements of content, method, and aim was sufficiently discussed in chapter vi and so need not be repeated here. A question that needs to be considered in more detail, however, is the relation of the intrinsic and formal values. This question may perhaps be most readily approached by taking our departure from the manner in which these two types of values have frequently been regarded in the past. The content values have not always been overlooked by the formalists. They have frequently discussed them, but they have looked upon them as subordinate to the formal or disciplinary values. W. H. Payne, in his "Training of Teachers," page 143, says: "Studies serve three main purposes and therefore have three main values. They serve for discipline, as a mental gymnastic; they endow the mind with instrumental knowledge, or knowledge for guidance; and they serve for delight." This order must not be taken as a chance arrangement, but it is implied throughout the chapter that the disciplinary value is as independent as the others and is probably the most important. This position is fallen into even by some who have rejected the traditional conception of formal discipline. Seashore, in the closing lines of the introduction to his "Elementary Experiments in Psychology," says: "Your primary aim in this course should be, not to collect facts, but to acquire training.

Carry habits of introspection, precision, analysis, and natural explanation into life and you will realize the force of our motto: not psychology, but to psychologize."

The thesis here maintained is that the formal values never take rank above the intrinsic values, but that, while they may at times be quite coördinate with them, they are usually subordinate to them. The most that Seashore could logically have done was to place the acquisition of training and the collection of facts on an approximately equal footing. This is especially true since his book is concerned primarily with psychological knowledge and not with psychological method. What is the purpose of "introspection, precision, analysis, and natural explanation," if it is not the acquisition of reliable facts, — facts that may be put to use in the duties of life? The point is not that the "training value" should be minimized, but that it should be viewed in its right relation. In life, method is for the sake of content, for the sake of results, and not for the sake of the method itself. In particular reference to psychology, we may say that we want accurate facts and principles primarily to be used in teaching, in law, in medical practice, in business, and so on, but in order to get these facts in a reliable and progressive manner, we must also give painstaking attention to "introspection, precision, analysis, and natural explanation."

We are dealing here with the formal value of education that comes through the channel of identity of method. What we have just said regarding method in psychology applies equally to method in every other study or activity. Valuable though method is, it cannot stand alone. It is necessarily subordinate to content and

cannot be taught except through content. This relation holds also in regard to the formal value that we have designated "identity of aim." Aims and ideals are relative to the concrete activities of life in school and in society, just as method is relative to content. Truthfulness, for example, is nothing by itself and cannot be taught in the abstract. It is a generalized ideal that rests upon many concrete instances of truth-telling to which it owes its life. Merely to have the ideal without putting it into practice, if indeed this is possible, would do no good. It would be "goody-goody" only, the attitude that is everywhere so heartily despised. And what is true here of truthfulness is again true of all other standards and ideals.

The transfer of mental function through identity of substance is not a gain through a formal value, strictly interpreted, but through a content value. This element accounts in part for the transfer of educational effect from one study to another, but the gain is received from the direct application of previously acquired knowledge. Mathematics, for example, assists in the study of physics directly as mathematics, and not indirectly in a formal way. This value therefore turns out to be the preparatory value considered in chapter vii.

This distinguishing feature of the element that we have called identity of substance brings out the point that the three identical elements we have mentioned are not of coördinate rank. They again fall into our familiar twofold classification of form and content. Only the identities of method and of aim are formal in the logical sense, while the identity of substance is contentful. This makes it clear that education may have a general value through content as well as through form, and it

suggests that for our present purpose the effects of education might better be divided into "specific" and "general" than into "formal" and "contentful."

66. The Formal Values in the Schoolroom. Although the formal values are subordinate to the contents of studies and of life, it does not follow that they should never receive specific attention in the schoolroom. At times it becomes desirable, and even necessary, to center attention expressly upon them. We do this whenever we emphasize ideals of conduct or teach students how to become self-helpful in study or in conducting investigations. The study lesson forms a good example. In this lesson the teacher makes an overt attempt to teach pupils how to study. This lesson is in place in every grade of school, and should be receiving more, rather than less, emphasis. It is quite as important to know *how* to study as *what* to study, even though the former is relative to the latter.[1] In the graduate department entire courses are sometimes given over to methods of investigation and all else is made subordinate to this end. Effective research requires accurate methods of collecting data and sound means of elaborating them after they have been collected.

Formal education is sometimes discountenanced altogether by modern educationists. This position can be taken only when the phrase is interpreted in the traditional sense. But the channels of identical elements and of habit formation, through which the effects of education are undoubtedly in a measure generalized, may also be looked upon as formal, and if we grant that these channels should receive specific attention, we grant formal education to that extent. That these chan-

[1] Cf. McMurry, *How to Study and Teaching How to Study.*

nels should receive attention is nowhere questioned. We have formal education not only in the study lesson, in teaching methods of research and in developing ideals, but also whenever we are developing technic in the manual arts. The musician gains in artistic skill by giving much of his time early and late to mechanical exercises, and the typist who first masters the mechanical side of his art, though slow at the start, gains most speed in the end. All exercises properly called training fall into this class.

The ideals that are developed in school either in whole or in part are many. In most instances these are so obvious that a detailed consideration of them is unnecessary. Honesty, veracity, carefulness, neatness, industry, perseverance, obedience, etc., are appreciated by all teachers and they seek to impress them. They do this both by pointing them out and emphasizing their value, and by seeing to it that the pupils apply them in their conduct. Conscious control and habit formation merge at this point and it is not always possible to tell which is in the ascendency, nor is this essential.

67. Composite Ideals. There are a number of highly cherished effects of education united with inherent disposition that may be considered in connection with the development of ideals, but which might also be classified under one or more of the intrinsic values, for they are the combined result of knowledge, training, and heredity. Among these are *steadfastness*, *open-mindedness*, *disinterestedness*, *responsiveness*, *reliability*, *judiciousness*, and *poise*.

Granting a sound native equipment, the person who is in addition truly educated is steadfast in the pursuit of his calling, but he is at the same time ready to adopt

improved ways of doing things and his mind is open to assimilate the advances made in the arts and the sciences. He is broad in his interests and is prejudiced against nothing that is worthy of human attention. He is unbiased; and to the needs, successes, and failures of others he is responsive. Nothing human is foreign to him, and when he can be of assistance, his help does not fail. Society can count on him, for, being able to foresee the consequences of his acts, he does promptly what he undertakes, and what he knows he cannot do he does not attempt. Purposely or carelessly he would inconvenience no one, nor would he knowingly be the cause of embarrassment to any seeker after truth. Lack of time and rush of business do not upset him, for he understands fundamental principles and so knows that the heavens will not fall. He is inwardly at ease, and his poise is a comfort to himself and a reassurance to all who come within the range of his influence. The handling of evidence in science, history, and art have made him judicious. He does not prejudge, but, awaiting all the evidence, he seeks to effect a cure or to offer an explanation, for he knows that knowledge is for the sake of control, not for condemnation. The stars that guide him are social and individual good, and to be of service is his ideal.

EXERCISES

1. Psychologically, what is an ideal? Distinguish from an idea; from a standard.

2. How might the words "specific" and "general" as used on page 162 be defined?

3. Is Spencer necessarily right? "We may be quite sure that the acquirement of those classes of facts which are most useful in regulating conduct, involves a mental exercise best

fitted for strengthening the faculties. It would be utterly contrary to the beautiful economy of Nature, if one kind of culture were needed for the gaining of information and another kind were needed as a mental gymnastic."

4. In addition to the values given in the three preceding chapters, Bagley gives another value which he calls the *theoretical*. He says: "Items of knowledge that have little or no significance in the practical affairs of life, from either a utilitarian, a conventional, or a preparatory standpoint, may nevertheless be necessary to a *system* of knowledge. . . . It is hardly too much to say that three fourths of every subject of instruction has absolutely no value when measured by the standards already discussed. A large part of its value is purely theoretical, — that is, it contributes to the coherence of the various facts and principles *as knowledge*" (4 : 233). Can you think of any facts and principles that have a purely theoretical value? May this be a confusion of the value of organization with the value of knowledge itself?

Discuss the following quotations in the light of the principles that we have studied.

5. Mathematics gives exercise in widening and generalizing conceptions, in combining various results under one head, in making schematic arrangements and classifications. — J. W. A. Young.

6. Comenius rightly defined the school as an *officina humanitatis*, or manufactory of men, and were this conception generally prevalent, studies of the humane and culture type would regain the standing which they held in a less "practical" age. — W. H. Payne.

7. They (the music teachers) make rhythm and harmony familiar to the souls of the boys, that they may grow more gentle, and graceful, and harmonious, and so be of service both in words and deeds; for the whole of life man stands in need of grace and harmony. — Plato.

8. The power to think well and the power to express well what we think are the two intellectual objects of a satisfactory secondary education. There are other intellectual objects

besides these two; they are very valuable, but they are supplementary, not fundamental. — A. W. West.

9. The man who has gained the power to picture accurately the scenes of ancient Athens and Rome will find it possible to combine in imagination the elements of a business situation in such a way as to seize opportunities and outflank his untrained competitors.

10. Taken by itself it [knowledge] is a part, and not the most vital part, of education. Surely the essence of a liberal education consists in an attitude of mind, a familiarity with methods of thought, an ability to use information rather than a memory stocked with facts, however valuable such a storehouse may be. — A. L. Lowell.

11. Whoever he be that shall give his mind to the study of music in his youth, if he meet with a musical education proper for the forming and regulating of his inclinations, he will be sure to applaud and embrace that which is noble and generous, and to rebuke and blame the contrary, as well in other things as in what belongs to music. — Plutarch.

CHAPTER X

THE CURRICULUM

68. Nature of the Curriculum. The curriculum of the school was briefly described in chapter iii as representing an epitome of man's life. Its materials spring from all times and places, and consist of those traditions and achievements of the race that have proved and are still proving to be of value in increasing the efficiency and richness of both social and individual life. These traditions and achievements are not necessarily all represented in the curriculum, but only those need to be there that cannot be efficiently acquired in the round of one's daily life and amusements. The curriculum thus becomes one of the avenues to a balanced and relatively complete human life. It is a means to an end, and has from this point of view been called the gateway to the life of the species.

The curriculum being a means to an end, it must necessarily vary as the end varies. Its content is determined by the life and environment for which it is to prepare. The curriculum of the Greeks corresponded to the life and ideals of the Greeks, that of the Romans to the life and ideals of the Romans, and that of the Renaissance to the life and ideals of the Renaissance. A monarchy cannot realize its ideals through the same curriculum as a democracy, and the curricula of both must vary as their ideals, their social and industrial conditions, and the content of knowledge vary. But within this changing mass there

is always a relatively stable core. A monarchy may remain a monarchy, and a democracy a democracy, while in addition a number of fundamental aspects of human life have been everywhere much the same throughout history. It becomes the task of the school, therefore, to meet at the same time both varying and relatively permanent conditions.

69. Its Scientific Determination. A scientific conception of what the curriculum should contain, the manner in which emphasis should be apportioned, and the spirit in which it should be administered could be obtained only by an inductive study of the entire gamut of human life. This would reveal not only what people are actually using, but also what their aspirations and needs are, and education could then, perhaps, be fitted accurately to life.

But this fitting of the elements of the curriculum to the elements of life would not be a simple process. Because an activity held a large or a small place in life, it would not follow that it should hold a corresponding place in school. Many men are engaged in digging ditches, but ditch digging need not therefore have an assignment on the curriculum. This with many other activities can be learned more readily right out in life. On the other hand, the enjoyment of good literature, which is naturally relegated to the leisure moments of life, might be found to occupy only a small fraction even of this leisure time. But this would not measure the time it should have in the curriculum. Society is much concerned with the way in which people spend their leisure, whether they are increasing or diminishing their own efficiency and the peace and comfort of others, and therefore people must be definitely equipped for the noble disposi-

tion of leisure. It often requires hard application to develop the capacity for literary and artistic appreciation, and therefore these subjects, although they are for the leisure moments of life, cannot be left to the leisure moments of the school. Just because the exigencies of life do not compel their acquisition, and baser enjoyments interfere with their spontaneous acquisition, they must be given an apparently disproportionate time allotment in the school. This makes it clear that the elements of the curriculum need not include all the aspects of life, and that they need not hold the same ratio to one another as their counterparts hold to one another in life.

An inductive study of the environment with a view to determine accurately the content of the curriculum has never been made and there seems to be no pressing need for it. The transition from one to the other is so complex that the curriculum would probably not be much influenced by such an inventory. At best we could expect suggestions for only slight modifications from this source, and it may be that the changes we are continually making on the basis of casual observation and social pressure are sufficiently exact. It would, however, be satisfying, and it might prove helpful, to have more accurate information than we now possess. But the best we can do now is to emphasize the fact that laymen as well as teachers should always bear in mind that the curriculum bears a close and vital relation to life as it now is, and that it must be modified as the demands of life are modified.

The most fundamental criterion for the selection of subject-matter, then, is pertinence to present life. For a study to be admitted to the curriculum it must be clear that modern life demands it on the basis of one or more

of the intrinsic values brought out in chapters vii and viii, and for a study to be retained it must likewise be clear that life still demands it for one or more of those values.

The classroom teacher, however, is seldom directly concerned in the admission or the discarding of studies. The curriculum is a perpetual instrument that is on the scene when the individual teacher arrives, and its modifications are the result of a combination of influences representing both the school through its leaders and society through boards of education. It is to be expected that these leaders, especially those representing the school, are well grounded in educational theory, but the classroom teacher requires this information no less. He needs a knowledge of fundamental principles and values, in order to be able to coöperate with the leaders, and especially in order to make his own teaching intelligent and effective. The latter is probably the more important reason of the two. Unless a teacher knows in some detail the ends that are to be gained from a study, unless he knows the functions that it is to discharge in life, his teaching must necessarily be blind and mechanical. Both content and formal values must be definitely aimed for if they are to be maximally attained. Merely teaching a subject without definitely knowing why can scarcely be dignified by the name of teaching.

Recognizing the fact that the curriculum is a perpetual instrument, it does not devolve upon us to determine it anew. We need only to gain a conception of its essential elements, the relations of these elements to one another, and their function in education and life. That being accomplished, we need also to consider briefly the principles underlying the administration of the cur-

riculum. To these topics this and the three following chapters are devoted.

70. Origin of the Studies. Before entering into the classification of the studies, we may raise the question of why we have separate studies at all. How do we come to have mathematics, geography, history, the sciences, and the rest? Is it because of characteristic and inherent differences in the facts themselves? Is the motive for division a purely human one? Or do both elements play a part?

It is said that all knowledge is one, in the sense of all being a part of the conscious experience of man, and that "it is only because we have different interests, or different ends, that we sort out the material and label part of it science, part history, part geography, and so on" (16 : 19). These words clearly create the impression, whether intentionally or not, that the *only* cause for the different studies is the human one of motives or ends. Studies arise from the fact that we need to divide experience for purposes of control. An undifferentiated mass would be unmanageable.

This is true as far as it goes, but psychologically, as well as logically, it does not go far enough. We *would not* have different studies if we did not find it expedient to classify knowledge according to the use we wish to make of it, but we *could not* have different studies if there were not inherent differences in experience to begin with. It is evident that the data given by the different senses are different. Sounds are different from colors and tastes are different from touch. Similarly primary differences exist in the data from the same senses. The normal person would not confuse red and blue, or sour and sweet. These differences, and others like them, are

fundamental and cannot be further explained. Consciousness is so organized as to be affected differently by the nerve impulses from the different senses, and of these differences it is immediately aware. If this were not true, we should not only be without our different departments of knowledge, but the possibility of all knowledge would be precluded. A homogeneous mass of experience could not become knowledge because one thing can be known only as being different from another. If, for example, there were but one color, we could not know color. The elements of our experience are not like the ocean, all of one sort, but more like the land, which is composed of sand, clay, gravel, granite, limestone, and the like. These original differences in experience enable us to sort them out and classify them. The motives for doing so come from the different ends and aims we have in life. These make the division of experience necessary in order that the ends of life may be more efficiently realized. The results are the various subjects we find in the curriculum.

Every subject of study that we have in school and in life centers about a characteristic and distinguishing core of thought or activity which is technically called a node. This node is used as a criterion for the selection of the data that make up the particular subject in hand. The node for physics is the phenomena of mass and force, for psychology the phenomena of consciousness, for medicine the pertinency of a datum to enter into the alleviation and cure of disease, for engineering the pertinency to meet the physical needs and conveniences of life, and so on through the list. The selection of these nodes is obviously made possible by the original differences in man's experience, and it is also obvious that the selection would not be made if man did not have a

variety of needs. The needs, and the consequent nodes, for physics and psychology mentioned above are again obviously different from those involved in medicine and engineering. Those of the former may be called theoretical or logical and those of the latter practical or arbitrary. These two types of needs give us two groups of studies. One of these groups contains the pure sciences and all other subjects, such as history and literature, whose function it is to present and organize knowledge content, and the other contains the applied "sciences," such as engineering and medicine. The secondary subject of geography also falls into the second group, although mathematical and physical geography should be classed as pure sciences.

The thought nodes that serve as criteria for the selection of subject-matter and for the determination of the boundary lines in geography and in the applied sciences consist of the relatively arbitrary and practical requirements of life. These subjects start with definitions that begin and end in human purposes, and the limits of the subjects are correspondingly arbitrary. The logical relationships of the data of which these subjects are composed are not taken into consideration in determining whether or not certain data should be included, but only their availability to meet some practical demand of life enters into such determination. This is well illustrated by geography, which has been defined as the study of the earth as the home of man. This definition has a purely human basis, and the boundary lines of the subject cut across nearly all the other subjects in the curriculum. The subject includes a little of astronomy, geology, botany, zoölogy, ethnology, art, history, and economics. In fact, anything that has any bearing what-

soever on "the interaction of the life of man and nature" may be legitimately included. The study of medicine similarly includes everything, no matter what its source, that bears on the alleviation and cure of disease; the study of engineering includes whatever bears on "the art of directing the great sources of powers in nature for the use and convenience of man"; and the study of education includes everything that bears on the aims and methods of instruction and training.

After the data that bear on medicine, engineering, education, and the like have been selected, they may then be further organized into separate studies. In this organization the logical relationships of the data may and should receive consideration, but it may be questioned that these relations should even then be primary. The principles of teaching, for example, may be organized on the same logical basis as psychology and the subject may then be called educational psychology, but perhaps a better basis of organization would be to assume the knowledge of psychology entirely and to consider only the availability for schoolroom practice as the basis for the selection of data, and the nodes of school practice as the primary bases for the organization of these data. The principles of teaching would then be at liberty to take its data from biology, logic, the principles of education, and other sources, as well as psychology; and these data would be organized about such nodes as interest and attention, the types of lessons, and moral training. The relation of the nodes to one another should of course be logical, and the facts and principles within each node should also be logically arranged.

In the pure sciences, and in all those other subjects that deal primarily with the organization of knowledge

content, and only secondarily with the use that is made of this content, the situation is quite different from what it is in the applied sciences. What one of these subjects shall include is determined, not by a node of practice, but by a node of logical or psychological similarity among the facts themselves; *i. e.*, not by a node of expression, but by a node of impression. The various facts of zoölogy, for example, possess an inherent similarity; they all have a core of likeness in the way they impress us and in the way we naturally react to them, and this likeness serves to distinguish them from the facts of any other subject. The same thing is correspondingly true of botany, chemistry, history, and the rest. The criteria and relationships used here are said to be "logical" rather than arbitrary, which means that they rest on ultimate differences in experience as such. The needs that prompt the selection of the nodes are here primarily theoretical or intellectual. Noticing likenesses and differences in his experiences, or, considered objectively, in the facts about him, man instinctively sets to work to arrange and systematize these facts on the basis of their likenesses and differences. Utilitarian considerations need in no way be concerned in this process, although both the facts and the system may later be put to practical uses.

When it is recognized that a study centers about a node of thought that is selected on the basis of a theoretical or a practical need, it becomes evident that the separate studies do not form discrete units like islands in the sea, but that they form a continuum like the spectrum. There are no sharp dividing lines between the studies, but they merge into one another very much as do the colors in the spectrum. Physics and chemistry,

and physiology and psychology, come together just as do orange and red, and just as we can center our attention between the orange and the red and get orange-red, so we can get physical chemistry and physiological psychology.

All knowledge, then, may be classed together as falling under the head of conscious human experience. But as an undifferentiated mass of knowledge would be unmanageable, humanity has found it expedient to divide this experience into the various studies and exercises that we find in the curriculum. Humanity has been enabled to do this because of the inherent differences that exist in the elements of experience and upon which it may lay hold. The needs that prompt the division of experience into subjects are of two kinds, — theoretical and practical. The theoretical needs lead to the organization of the fundamental subjects and sciences, while the practical needs lead to the derived and applied sciences. The subjects, when organized, are not discrete, but form a continuum similar to that of the spectrum.

71. Classification of the Studies. Experience having been differentiated into the various elements of the curricula that we find in elementary, secondary, and higher schools, our next task is to gather them together again. To the casual observer these elements appear to be indefinite in number and destitute of inherent relationships. This is, of course, not true, and in order to gain an efficient and manageable conception of them, we must classify them. This has been done in many different ways.

William T. Harris divided the studies into five classes and spoke of the five windows of the soul from which education should draw the curtains. He said : —

The studies of the school fall naturally into these five groups: first, mathematics and physics; second, biology, including chiefly the plant and the animal; third, literature and art, including chiefly the study of literary works of art; fourth, grammar and the technical and scientific study of language, leading to such branches as logic and psychology; fifth, history and the study of sociological, political, and social institutions (33 : 323).

Nicholas Murray Butler defines education as the gradual adjustment of the individual to the spiritual possessions of the race and then continues: —

Those possessions may be variously classified, but they are certainly at least fivefold. The child is entitled to his scientific inheritance, to his literary inheritance, to his æsthetic inheritance, to his institutional inheritance, and to his religious inheritance (9 : 17).

To this list, the writer understands, President Butler would now add the industrial inheritance.

Another classification that is old and widespread, and that with slight variations has been much used by the Herbartians, is fundamentally twofold. This is accepted by De Garmo, who, however, makes it threefold by adding an appendage. He says: —

The broadest and most obvious distinction in the content of subject-matter of knowledge is that between (1) the facts and laws of physical nature, which, though observed and formulated by the mind, are not dependent upon the mind for their existence or validity, and (2) the linguistic, literary, artistic, and institutional constructions that have their genesis in the thoughts, feelings, and volitions of human kind. The first group pertains to nature, the second to man; the first might be called the sciences (including mathematics), the second the humanities. Both have from the

earliest times been in varying degrees the subject-matter of education.

So intimate and so important, however, have the interactions between the purely natural and the purely human become that a convenient threefold grouping may be proposed, as follows: —

1. Natural sciences (including mathematics), or those that pertain solely to nature.

2. Humanities, or those that pertain primarily to things purely human, such as language, æsthetics, politics, ethics, religion, etc.

3. Economic sciences, or those in which the laws of nature are applied by human volition to produce the conditions for the well-being of individuals, the multiplication of populations, and the further development both of natural science and all that pertains to man as such. To this group we may assign not only economics proper, but many technical branches arising from applied science (14 : 45 f.).

In this classification groups 1 and 2 are clear enough, but the same cannot be said for group 3. What De Garmo appears to mean by the "economic sciences" are the useful arts, or the industrial and other technical applications that are made of the sciences, which should certainly be provided for somewhere. Another weak point in this classification, which holds also in regard to the classifications made by Harris and by Butler, is the fact that form and content studies are not distinguished. All these points of weakness are logically covered by the following arrangement, for the fundamental scheme of which the writer is indebted to Dr. Elmer Ellsworth Brown, United States Commissioner of Education. For the manner in which the scheme is carried out, however, the writer alone is responsible.

72. The Curriculum Outlined.

	CONTENT	FORM	EXPRESSION
Man, or The Humanities	Language Mother tongue Foreign tongues History and Content of Literature History and Content of Art Paintings Sculpture Architecture Musical compositions The Dance Social Science Political Geog. Hist. and Civics Political Science Sociology Commercial and Industrial Educ.	Mechanics of reading and writing Grammar Rhetoric Scissor work Color work Drawing Æsthetics Musical notation and technic Physical Culture Ethics Manual, Business, and Industrial Training Political Economy	Reading Speaking Writing Literary production Sketching Painting Sculpturing Architecture Music Vocal Instrumental Dancing Graceful carriage Gymnastic skill Athletic sports Social life Citizenship Industrial and Commercial Activities
Nature, or The Natural Sciences	Physical Science Chemistry Physics Astronomy Earth Sciences Mathematical and Physical Geography Geology Biological Science Botany Zoölogy Bacteriology Physiology Mental Science General Psych. Child Psychology Animal " Abnormal "	Mathematics Arithmetic Algebra Geometry Trigonometry Calculus Laboratory technic Logic	Useful Arts Applied Chemistry Applied Mechanics Applied Electricity Applied Geology Scientific Agriculture Printing Medicine Dentistry Research
The Ultimate, or Philosophy	Hist. of Philosophy Metaphysics Theology	Epistemology	Religious life Conduct

This arrangement, while fundamentally threefold, may also be looked upon as ninefold. The fundamental divisions are the horizontal ones into Man, Nature, and The Ultimate, or the Humanities, the Natural Sciences, and Philosophy. The natural sciences and the humanities have been ably characterized and distinguished in the quotation cited above from De Garmo. Philosophy, however, cannot be logically placed in either of these groups because its subject-matter is the whole field of knowledge and action. It deals with *ultimate* structure, method, and meaning, and so belongs to a group by itself, a group that sums up the final essence of the other two groups.

The vertical divisions are less fundamental, although for the school no less significant, than the horizontal, and are also threefold in final analysis. The terms assigned to them are Content, Form, and Expression. An examination of the separate divisions discloses their nature and distinctions better than a description can do.

73. Form and Content Distinguished. Form and content have long been distinguished. "Content" refers to those aspects of knowledge that are immediately valued in life. It includes the facts and phenomena of nature and life as they are presented to us without ourselves taking part in their production. In physics we have the phenomena of mass, heat, light, electricity, and radioactivity; in chemistry, the elements and their characteristic behavior; in botany, the plants; in zoölogy, the animals; in psychology, consciousness; in history, the facts and events of the past; and so on. These facts and phenomena comprise the *content* of the several subjects in the first column, which might in a descriptive way at least be studied without reference to the subjects in the other two columns.

The "form" subjects may be described as the instruments by means of which content is investigated, precisely described, systematized, and managed. The relation of mathematics and physics forms an excellent illustration. Physics as a mere descriptive science would be quite unwieldy and would amount to little, but in the garb of mathematics it becomes systematic, precisely intelligible, manageable, and serviceable; and what mathematics does for physics, it does in a greater or less degree for all the other sciences, those pertaining to man as well as those pertaining to nature. Grammar and rhetoric are the form of language and literature. Language cannot well be described and criticised without them. Æsthetics sets forth the form or essential qualities of the beautiful in the fine arts, ethics of the good in character and conduct, and logic of the true in knowledge. A certain amount of technic is needed in the study of all the sciences, especially in the biological, and it is of assistance also in comprehending the facts of music and of art. But technic bears on the whole a more vital relation to the expressive activities in the third column than to the content subjects in the first. It should be noted, however, that all the form studies face both ways, touching content as well as expression. They are needed in carrying forward the activities of life no less than in acquiring and systematizing knowledge. In fact, they form the connecting link between content and expression, making both the possession and the application of knowledge possible. Looking at the curriculum in this unified way, we have on the left-hand side *theory*, and on the right-hand side *practice*.

74. The Expression Subjects. Under the head of "expression" are grouped all those subjects that may be

characterized as comprising the basal activities of life. They comprise what we ourselves do, and in this respect are the direct opposites to the content studies. These activities, although they antedate both of the other groups of subjects in time, have but recently been admitted to respectful membership in the curriculum. The reasons for this are at least threefold, being technological, social, and psychological, all of which are intimately interwoven. Socially, it has not hitherto been necessary to provide for these subjects in school because it was possible to acquire them either incidentally or by means of the apprentice system in life. The dentist learned his calling in the office, the engineer in the shop or field, the accountant at the desk, and the farmer on the farm. But the advance of technical or scientific knowledge has transformed all these callings into professions resting upon consistent theory, so that it has become quite impossible to acquire them in an incidental way in life. The systematic instruction demanded by this technical basis is reinforced by social competition, which still further precludes haphazard methods. The unsystematically trained worker cannot successfully compete with the worker that is systematically trained. Furthermore, society no longer trusts him and has in many cases excluded him by means of legislative enactment.

On the more purely social side two other observations should be made. It is being recognized more and more (1) that insight into vocational and artistic activities is educative, in the sense of being socializing and liberalizing, and (2) that education for citizenship includes the development of the power to be economically productive. It used to be assumed that the school had discharged its function in preparing for citizenship when it

had prepared the individual to cast an intelligent ballot, to render honest service in holding office, and to discharge all other duties of citizenship in an enlightened and trustworthy manner. But this is now no longer held to be sufficient. The most fundamental requirement of all in good citizenship is productive labor, and the burden of meeting this requirement is being placed more and more upon the school. So long as education was chiefly for the upper and professional classes, who looked down upon manual labor, vocational activities were looked upon as being outside the pale of education. But with the advance of social democracy this is gradually changing. It is being seen that all necessary labor is honorable, and that society through the school has a duty toward all its members, and not only toward those in the professions. Adjustment to life includes the ability to earn a livelihood, and whenever this ability can be conferred most effectively by the school it becomes the function of the school to confer it.

The socializing and liberalizing value of the expressive activities is now no longer questioned. It is even recognized that some participation in these activities constitutes an essential part of a liberal education, but social organization has become so complex, and specialization has been carried to such an extreme, that most people would have to remain permanently ignorant of nearly all of them unless they were taught in school. Comparatively few of them can now be incidentally picked up in the home and the neighborhood, as was still true only a few decades ago, and they must consequently be included in the curriculum.

On the psychological side we are realizing more and more that expression is quite as essential as impression

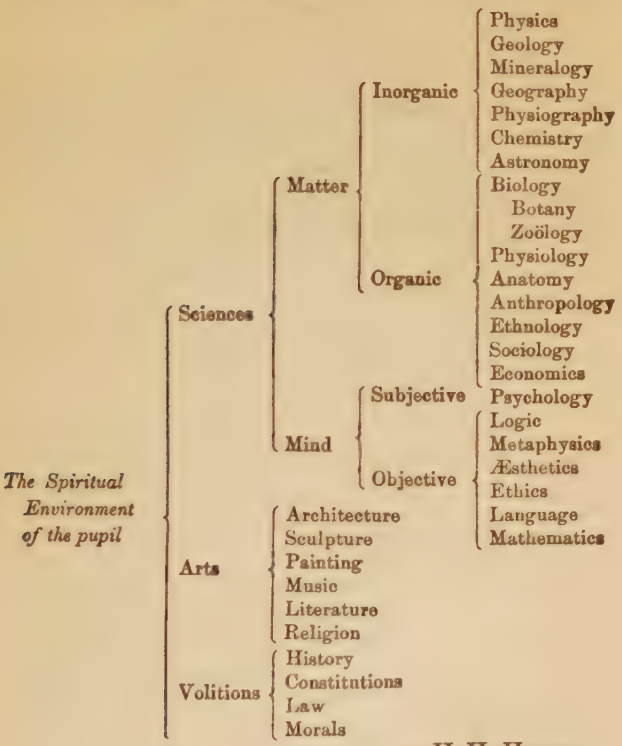
in the acquisition of knowledge. Consciousness has a motor as well as a sensory side, and the school must take both into account if the knowledge it imparts is to be complete. The test of knowing is doing, and the doing reacts on the knowing, both deepening the impression and giving it genuine meaning. In practical matters this has perhaps always been realized. Both Plato and Aristotle again and again make the observation that for a person to become an appreciative and reliable judge in any art, such as music or painting, it is necessary for him to be in some degree a performer. In the world at large probably a disproportionate amount of importance has always been attached to experience as compared with knowledge of theory, but in the school the reverse has been true. In neither case, however, has the intimate psychological relation of the two been recognized till recently, a change to which experimental psychological investigations have contributed no small share. But it is now beginning to be seen that all theory exists for the sake of practice, without which it is empty, and that practice without theory is relatively blind and untrustworthy. This speaks emphatically for the use of the social activities in education, not merely for vocational reasons, but for educational purposes as well. This may be done in part by bringing these activities into the school, and in part by taking the school to the activities by means of the school excursion.

EXERCISES

Discuss the following classifications of studies.

1. The elements in the spiritual environment are three in number. The reason for this number lies in the nature of mind. . . . The mind knows, and feels, and wills. . . . Con-

sequently the three elements of the spiritual environment are the intellectual, what is known; the emotional, what is felt; and the volitional, what is willed.



— H. H. Horne.

2. (a) Studies dealing with space and time — mathematics; (b) sciences of matter — physics, chemistry, biology, etc.; (c) historical studies — law, language, arts, trades; (d) psychological studies — ethics, æsthetics, mental philosophy; (e) religious studies — theology and natural religion. — T. Hill.

3. I. The Formal Studies — mathematics and language

(grammar and logic); II. Inorganic sciences; III. Organic sciences; IV. Sciences of mind — psychology, ethics, literary art, philosophy; V. Social sciences — literature, history, economics, political science, sociology. — George E. Vincent.

COLLATERAL READING

De Garmo, Principles of Secondary Education, I, 44–51.
Harris, Psychologic Foundations of Education, 321–341.
Horne, Philosophy of Education, 101–102.
Monroe, Text-Book, 739–759.
Vincent, Social Mind and Education, 115–135.

CHAPTER XI

THE EDUCATIONAL VALUE OF THE HUMANITIES

75. Meaning of "Subject"; Values Specific. In considering the educational value of the several subjects we must recur to the outline of the curriculum on page 179. In evaluating a subject it should be looked upon as extending all the way across the page, as implicating content, form, and expression. Only in this way can its full significance be obtained. The form subjects have almost no significance by themselves, but derive their value from the content and the expression subjects. The content subjects, too, cannot stand alone. They need the form subjects to give them shape, and their fundamental significance is revealed only by their expression in life. The expressive activities in turn depend on form and content, especially the latter, for their illumination. We are dealing here with a threefold unity, any one aspect of which may be legitimately emphasized at the expense of the others, but which can never be legitimately isolated from them.

In assigning educational values to a subject, careful discrimination should be used. Specialists, and sometimes others also, often indiscriminately assign to one subject every value in the list. If a person could believe them, he should be able to get a liberal education and a noble and upright character from pursuing singly almost any one of the subjects. This indicates a crudeness on the part of educational writers that is unpar-

donable. So treated, educational values do not discriminate and their purpose is defeated. The truth is that one subject usually has but a few main values which may be specifically designated. Unless they are so designated, little or nothing is accomplished.

76. The Mother Tongue. The fundamental aim in teaching the mother tongue is the practical one of reading, writing, and speaking. The subject is the one most basic and most universally needed in the curriculum. It is a tool that is needed in all the other subjects and every day in life. This fact is receiving recognition in modern educational practice, for a large amount of time is being given to the mother tongue, both in the elementary and in the secondary schools. In the elementary school it is represented by reading, spelling, composition, and grammar; and in the high school by grammar, rhetoric, and composition. In both schools the work culminates in literature, which, however, cannot strictly be classed as an aspect of the mother tongue. It belongs logically in the group of the fine arts.

Under content the mother tongue is represented by the study of idiomatic expressions and by the meaning and usage of words; under form it is represented by the mechanics of reading and writing, and by spelling, grammar, and rhetoric; and under expression by reading and by oral and written composition.

Spelling, pronunciation, and the grammatical correctness of speech and writing are sometimes said to have only the index aspect of the conventional value. They have this value in a marked degree, for the person of incorrect language and spelling is very generally classed as crude and uncultured, but they have other values as well. They promote social efficiency through

having the practical value. The person who is master of expression can tell what he has to say without waste, and those who read or listen can readily understand. The incorrect speaker or writer, on the other hand, is not so readily understood, and his errors distract the attention of the listener or reader from the content to the form. Elegant language, which, however, is more a gift than an acquisition, is pleasing and so has the ornamental value.

The opinions regarding the educational value of grammar are unsettled, if not chaotic. Practically every value in the category has been assigned to it, with special emphasis on the formal values of discrimination, and exact, logical thinking. But if our analysis has been correct, the formal values never enter in determining the admission of a subject to the curriculum and so should not be considered here. They belong to the sphere of method. A person who is taught grammar properly will necessarily have to discriminate and think logically; but if there were no intrinsic reasons for teaching grammar, he could well rely for this training on some other subjects that are intrinsically valuable. Proper methods of teaching always imply this training; and as the formal values are in the main but slightly generalized, no subject has any special preëminence in them.

Grammar being a form subject, one would expect it to have the preparatory value and thus be of assistance in ministering to the interpretation of language and to the correctness of expression. These features, especially the second, are now frequently denied, but they may well be reconsidered. We seldom consciously analyze an English sentence in order to determine its mean-

ing, but we do sometimes, and in reading a foreign language we frequently have to resort to analysis. In correcting inaccuracies of expression, both in speech and in writing, grammar forms the common language between teacher and pupil. It is the only logical means of exact criticism and commendation that the teacher has, and for the individual it forms a similar means of self-criticism. Without it the individual would be quite helpless in improving his own speech, and especially in improving what he has written. He would have only the sound, but no definite rules to guide him. It is true, of course, that correct expression does not immediately and easily follow the knowledge of the error. This is because expression involves the factor of habit. In ordinary speaking and writing we think the thought, and let habit take care of the selection of the words we use. But habit may be reconstructed, and in this process knowledge is a fundamental requirement.

In learning a foreign language, grammar is of undoubted instrumental value, even when the method of instruction is fundamentally inductive. It systematizes what has been learned, assists in expression, and is frequently the key to the meaning of what is read.

For the general student the preparatory value is the chief one that grammar has, but through its relation to language it shares also in the conventional value. Because it imparts a scientific conception of language structure, it possesses the liberalizing value ; and this may be deeply significant for the scholar. The sentimental value of grammatical study, although existing for a few, is quite negligible.

The educational value of rhetoric is similar to that of grammar. One applies to the agreement and correct

construction of words, and the other to the effective arrangement of words in sentences, and to the forms of discourse. The value of both consists primarily in aiding the effectiveness of expression, and secondarily in ministering to the completeness of the knowledge of one's immediate environment.

77. Literature. While literature should logically be discussed in connection with the fine arts, we shall consider it here because of an observation that should be made regarding the teaching of ancient literature. This observation can be made better before than after taking up the educational value of the ancient languages.

Literature includes on the side of content, the study and appreciation of literary productions; on the side of form, grammar, rhetoric, and prosody; and on the side of expression, literary production. This production may, however, vary in all degrees of pretentiousness. A letter written for the enjoyment of a friend would meet the criterion of literary expression.

The educational values of literature were used in chapters vii and viii to illustrate the moral and the sentimental values, and so have already received incidental discussion. We pointed out that literature makes an especial appeal to the æsthetic, comic, moral, and social sentiments. We read literature for amusement, recreation, and edification, but frequently also for the information that it imparts. This information gives an insight into the thought-life and aspirations of mankind, and so is distinctly liberalizing, while the appeal that literature makes to the moral and social feelings gives the subject a high rank as a socializing influence. All these values are of course not to be looked for in every literary production. The æsthetic value is found most

often in poetry, but is by no means restricted to it, while the socializing value is found most often in prose, such as the novel and the short story. The essay presumably takes highest rank in the liberalizing value, but all literary productions, especially when studied historically, share in this value.

American and English literature have a large and assured place in the curriculum, and so need no special assistance; but a word should be said for reading the ancient literatures in translation. These literatures are of great and unquestioned value, and we need to conserve them in modern life. It used to be held, and still is in some quarters, that the ancient languages should introduce the student to ancient culture, but this is no longer tenable. Scarcely one in a thousand of those who study these languages carries the work far enough to get anything worth mentioning of the ancient culture. It is very near the truth to say that only those who become specialists in these languages do; and if we class high school teachers of Latin and Greek as specialists, even these cannot all be included. We have, however, been depending on this source for the dissemination of ancient culture, and our results have been pitiful in their meagerness. We now possess excellent translations of the ancient writers, but they are seldom systematically used in the literature class. It was the writer's good fortune, some years ago, to be given a course of seventy-five hours in both Greek and Latin literature under Professor W. J. Brier at the River Falls, Wisconsin, State Normal School. The course preceded the work in English and American literature, for which it was meant to be preparatory, but it proved to possess more than the preparatory value. We read and discussed the exist-

ing masterpieces of nearly all the Greek and Latin literary writers, and the course still stands out in the writer's mind because of its unique and general worth. The results of three or four years he devoted to Latin seem insignificant in comparison, and this is the testimony of others who have had similar experience.[1]

The chief objection usually offered to a course of this kind is that much is lost in the process of translation. It cannot be denied that something is lost, but probably less than the conservatives would have us think. We have our Bible in English, and we think that it is very good and quite true to the original. Luther's translation of the Bible is looked upon as a faithful masterpiece, and the Germans are prone to think that their Shakespeare is not a bit inferior to ours. The truth is that translation alters the form only, leaving the content and spirit, which are the most valuable parts, practically unchanged. The poetic spirit of Plato as compared with Aristotle is quite as evident in a good translation as in the original.

78. **Foreign Languages.** The foreign languages may be divided into two groups, — the ancient and the modern. For the general student the former includes Greek and Latin and the latter German, French, and sometimes Spanish.

It is generally admitted that a liberal education is incomplete without the study of at least one foreign language. Because of the comparative nature of knowledge, it is true, as Goethe said, that "A man who knows only his own language does not even know that." He has neither the motive for, nor the means of becoming conscious of what language, as such, really is. The

[1] See for example, *Educational Review*, xxxiii, 480.

language element in his environment is not fully appreciated, and cannot be, till the contrast furnished by another tongue makes it evident. This gain from language study is usually called the development of the language consciousness and is liberalizing in its nature. It implies an appreciation of what language really is, as regards pronunciation, vocabulary, and grammatical form, which cannot be adequately gained by studying the mother tongue only.

The liberalizing value of language study is no doubt rightly put first. Either an ancient or a modern language will satisfy this demand, but for the general student a modern language might also prove of practical value, while an ancient one would be far less likely to do so. As a reading knowledge of the modern languages is more readily acquired than of the ancient, it may not be too much to expect that this knowledge will lead the student into the literatures of these languages. Some acquaintance with these literatures is naturally acquired in the classroom, but the number of students who continue their reading beyond the classroom into life is apparently but a small fraction of the whole. Still, it may not be much smaller than the fraction of the English literature class that continues to read classic English literature. For service in travel it would indeed be well to know at least French and German. It is taken for granted, of course, that the language would be pursued long enough to be of service in reading and speaking. The conventional motive for language study, especially Latin and French, is still large and should no doubt be curtailed.

Much is usually made of the point that a foreign language, especially Latin, gives a knowledge of root-

words, prefixes, and suffixes, and so helps in the mastery of the mother tongue. This is beyond question an incidental gain worth mentioning, but it is an incidental gain only. No one would put a foreign language into the curriculum solely or chiefly for this reason. An equal amount of time given to the mother tongue directly would be far more effective in this respect. The gain is also obtained from a modern language, but in a somewhat less degree than from Latin. The old-fashioned "word analysis" need not be despised in this connection.

Language study may be, and frequently is, made an effective indirect means of gaining an insight into the geography, history, industries, customs, and culture of the people whose language is being studied. The texts pursued by the class naturally give some of this information, but reference is made here to the information gained from courses outside of the immediate class work. A class studying German, for example, is in the proper psychological attitude to study broadly about the Germans and their country, and teachers are wisely taking advantage of this opportunity. The information gained has the social and liberal values, but these values as here realized cannot be ascribed to the language study itself. The language study serves merely as an introduction to them, but the introduction is quite an indispensable one.

Translating the lesson in the classroom is a question of method, and so does not belong here; but when it is claimed that composition is taught best by means of translation and that training in English as the result of careful translation of Latin is the first and most important reason for studying Latin,[1] it becomes a question of

[1] See above, pp. 154–155.

aim. If this were true, it would be a sad commentary on our teachers of English, but there are few who will believe it. From the standpoint of method, as illumined by psychology and experience, it may be remarked that translation is beginning to be discountenanced altogether. The best teachers are reducing it to a minimum, especially in the modern languages, and many teachers of the ancient languages are also discrediting it. It is forbidden by the principle of habit. When translation is used, the habit of gaining the thought indirectly is formed, and this habit must later be broken, which is a hard and sometimes an impossible task. The aim should be to have the student get the thought from the original directly, and not indirectly through the mother tongue.

We have so far confined our remarks to the general student. All the values mentioned apply also to scholars and specialists, but for them the emphasis must be modified. The practical value looms much larger here. Every scholar needs both French and German as working tools, and many need in addition one or more of the following: Spanish, Italian, Latin, Greek, Hebrew, and Sanskrit. If it is granted that ancient culture should be disseminated through translations, the general student may not need an ancient language, but this does not mean that these languages no longer require a place in the curriculum; by no means. Society still needs them, and probably always will. It needs them in the hands of all those specialists whose work brings them into vital contact with ancient culture and civilization. Our knowledge must be advanced continually along these lines, and every generation must have ancient life reinterpreted for it in the light of all that is new. For this an exact and first-hand knowledge of the language con-

cerned is required. The research student must always come in touch with sources as nearly first hand as possible, and can never be satisfied with translations.

The specialists who need one or more of the ancient languages are teachers of language, archæologists, ancient and European historians, historians of philosophy, specialists in Roman law, and clergymen. For teachers of the ancient languages some knowledge of Sanskrit, and for teachers of the modern languages both Latin and Greek are desirable. The needs of the archæologist and historian must be determined by their special fields. The historian of philosophy needs Greek and Latin, and if he includes the lore of the East within his domain, he needs Sanskrit as well. The specialist in Roman law needs Latin, but for the practicing lawyer, history, and social and economic science are so much more important that Latin sinks into insignificance. For the clergyman Hebrew, Latin, and Greek are naturally all desirable, but he cannot afford to sacrifice natural and social science in their behalf. There should, however, be time for both. The physician is intentionally excluded from this list. He may take Greek and Latin for cultural and conventional reasons, but he does not need them directly in his profession.

79. **The Fine Arts.** The next group of subjects in our outline of the curriculum may be designated the *fine arts*. In addition to literature, this group contains on the content side music, painting, sculpture, architecture, and the dance. By the last is of course meant the dance in history as a form of æsthetic expression. On the form side we have musical notation and technic, scissor work, color work, drawing, and the principles of æsthetics. From some points of view, physical culture also belongs here.

Under expression we have the execution of the various activities enumerated, both in school and in life. It includes musical accomplishment, sketching, painting, sculpturing, the profession of architecture, and the various æsthetic and skillful physical achievements.

This entire group of studies is still poorly organized from an educational standpoint. The Athenians gave systematic attention to the fine arts and obtained splendid results, but with the decay of their civilization they went into eclipse, from which they have not yet fully emerged. Their unique worth in education and life is now recognized again, and it is only a matter of time when they will have regained their proper place in the schools. A serious difficulty encountered is the task of fitting these arts vitally into our present school machinery. Their teaching needs necessarily to be accompanied by various expressive activities, which fit poorly into our present school furniture and school organization, and for the effective teaching of the content side of the space and form arts, galleries and museums are all but indispensable. But even when these limitations are recognized, more could no doubt be accomplished than is being done at present. We need to appreciate the ends and aims of art more distinctly and to get teachers equipped with pedagogical training to carry them out. A mere artist is likely to be a poor teacher in this field from an educational point of view. We need first of all to recognize here the three aspects of content, form, and expression. Artists usually get lost in the third, teachers in the second, and the first is seldom given any systematic attention in the school, except in one course, — the college course in the history of art.

It is generally recognized that the aim in teaching

the fine arts, so far as the elementary and the secondary schools are concerned, is not to produce artists, but to develop the appreciation of painting, sculpture, and architecture; to teach national, folk, and other simple songs for group singing; and to develop sufficient skill in drawing to use as a mode of expression. A sketch is frequently a more effective mode of conveying thought than either spoken or written words, and everybody can find use for it. Then, too, this amount of skill in drawing is needed for the appreciation of the space arts. Color work is also needed for this purpose and in many other phases of life. In music the school at present can do little more than teach notation and group songs, but in both of these respects America is behind the countries of continental Europe. Song is everywhere a matchless means of recreation and emotional expression, and deserves a conspicuous and permanent place in life. Solo work and instrumental music may perhaps always be left to private instruction.

While in most of the school subjects form and content are given disproportionate attention, in the art subjects content is relatively neglected and only form and expression are taught. Although the time given to the latter cannot be reduced, the results achieved are left comparatively empty without giving more attention to content. Just as in literature we do not aim to produce men of letters but to give a knowledge of content and development for the sake of life and appreciation, so in the fine arts we should aim primarily for general art appreciation, so that life may be enriched, rather than for the production of artists. But art cannot be intelligently appreciated unless it is known through study any more than can literature. The knowledge required must be

given in courses especially devoted to content. This will prove somewhat more difficult here than in literature, which needs only to be read and read about, but the difficulties are being successfully met in a number of places. In music the great masters and their masterpieces are studied about just as they are in literature, but in place of reading the masterpieces, they are interpreted for the class by means of the piano, organ, orchestra, or song. In this way music may become known just as literature is known, and with a corresponding gain in appreciation.

Painting, sculpture, and architecture should also be studied historically, and visits to galleries and museums must replace the recitals or the reading. When this is impossible, recourse must be had to the stereopticon, photographs, and other copies. Systematic texts, illustrated where possible, should be in the hands of the class in all these subjects. The work may be effectively summarized in the college by a course in the principles of æsthetics.

The historical aspect of the dance may perhaps be studied in connection with music, but in the main the aim in physical culture must center in the expressive activities of dancing, carriage, gymnastic feats, and athletic sports, which have social and æsthetic values. Health and recreation are best attained when aimed for indirectly. The attention must center in the activity rather than in the result, and must be accompanied by interest and enthusiasm to be maximally beneficial.

Physical culture is another subject that is not given its proper share of attention in modern education. We make much of inter-collegiate athletics, but systematic physical education is almost unknown, especially in the

elementary and secondary schools, where it would give the best results. The foundations for physical grace, skill, and health should be laid early, when the bones and muscles are plastic and growing.

80. The Social Sciences. The next sub-group under the humanities may be styled the *social sciences*. This group includes on the side of content, political geography, history, civics, political science, sociology, and commercial and industrial education; on the side of form, ethics, manual and industrial training, and political economy; and on the side of expression, the various aspects of social, political, industrial, and commercial life. With the exception of political geography, history, and ethics, all these subjects are new recruits in the curriculum, and in their modern interpretation, all may be called new. Industrial training and education are indeed very new, being only now at the point of gaining admission.

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The chief value possessed by these subjects is naturally the social value, but they possess also the practical and liberalizing values in a high degree. They are central in adjusting man to his social environment. They are indeed so fundamental that many would confine the aim of education to their sphere and make all the other subjects tributary. While this is unjustifiable, their high and indispensable value in modern life and education cannot be gainsaid, and they are unquestionably destined to occupy even a larger place in the curriculum than they now have. They are of especial service to the clergy, legislators, judicial and executive officers, and all others who have a directing influence on society; but they are of general service also in supplying the basis for intelligent and sympathetic social coöperation.

Geography is a secondary subject, deriving its data

from many quarters, and so cannot be rigidly classified, but its fundamental point of view is social, and it therefore belongs in this group. Its aim is to acquaint man with the earth as the scene of his varied activities, and it therefore possesses the preparatory, conventional, socializing, and liberalizing values in a high degree.

History may be said to put the third dimension into the field of knowledge. It gives it depth by extending it backward in time, which is a liberalizing effect. In relation to the other subjects history is chiefly preparatory. Language, literature, art, and philosophy, and certain aspects even of the sciences, cannot be fully understood without history. But the chief value of history is the social. Says Dewey: —

The evils of the present industrial and political situation, on the ethical side, are not due so much to actual perverseness on the part of individuals concerned, nor to mere ignorance of what constitutes the ordinary virtues (such as honesty, industry, purity, etc.), as to inability to appreciate the social environment in which we live. It is tremendously complex and confused. Only a mind trained to grasp social situations, and to reduce them to their simpler and typical elements, can get sufficient hold on the realities of this life to see what sort of action, critical and constructive, it really demands. Most people are left at the mercy of tradition, impulse, or the appeals of those who have special and class interests to serve. In relation to this highly complicated social environment, training for citizenship is formal and nominal unless it develops the power of observation, analysis, and inference with respect to what makes up a social situation and the agencies through which it is modified. Because history rightly taught is the chief instrumentality for accomplishing this, it has an ultimate ethical value (16 : 23).

History gives social insight by revealing both the genesis and structure of the social order and the conditions of social advance. Present social life is so complex that its elements cannot be grasped when approached directly. These elements must be approached historically and traced from their inception, if their real significance is to be appreciated. From Greece we get the significance of art and individual initiative, from Rome the principles of political organization, from Palestine the heart of our moral and religious life, and from the Middle Ages many minor customs and practices. Anthropology, which may be regarded as a phase of history, carries this analysis still farther back, giving us the initial development of the very elements of civilization.

The conditions of social progress can be apprehended directly still less. Although the causes of advances and retrogressions are complex, they may in a measure be ferreted out and made available for the present and the future. Types of the influences involved here are the attitude toward individual initiative; toward freedom of the press, speech, and belief; toward civic and personal righteousness; and the effects of inventions, of international commerce, and of the dissemination of education. Nations, like individuals, must live according to the principles of enlightenment and justice, and both this fact and the principles involved can be appreciated fully only through the study of history.

The primary value of civics is the socially practical value. Intelligent citizenship depends upon it quite as much as upon history. When rightly taught it should lead to intelligent voting and the upright discharge of all social-political duties. Political science is a deeper and more extended study of the same subject.

Sociology supplements history in revealing the details of the social structure and in laying bare the forces at work in producing a higher and more just social organization. By means of exact description and measurement it makes these elements more available for social insight and control. With obvious and comparatively slight modifications, the remarks made in connection with history apply to sociology also.

Ethics is the science that resolves conduct into a consistent system. It deals with the *form* of the good and the bad, or the right and the wrong, in conduct just as æsthetics deals with the form of the beautiful and logic with the form of the true. It is in a measure presupposed by all social subjects, holding a relation here analogous to that of mathematics to the natural sciences. It is, however, most closely related to sociology. For this science it furnished the principles of guidance in application and therefore is indirectly practical. It supplies the factor that makes moral training and social control intelligent and rational. Subjectively it is in a high degree liberalizing. It aids in removing the shackles of superstition in regard to conduct, and in setting the mind free.

Commercial geography, commercial and industrial education, manual and business training, and political economy all form aspects of one large subject which culminates in our various industrial and commercial activities. Together with history and sociology, these subjects deal with the underlying bases of our business, social, and political life. Domestic art and domestic science should also be classified in this group.

The practical value of these subjects is at once evident, and they are being introduced into our schools chiefly

on that basis. They possess the practical value both for the individual and for society, and they possess it in a high degree, but we need to realize that they possess also the socializing and liberalizing values. The person who has a thorough acquaintance with the industrial and commercial aspects of his environment can scarcely help having the range of his sympathies enlarged and his mental horizon broadened. A person can be intelligently sympathetic and coöperative only with those whose general surroundings and round of daily duties he understands, while, on the other hand, the liberalizing influence attaches to the understanding of all the elements of one's environment that rest upon law and system. To understand our banking system or our railroad industry is no less liberalizing than to understand a science or a foreign language. Such knowledge puts one in touch and harmony with large and influential elements of modern life. To be ignorant of them compels one just to that extent to live as a stranger in a strange land.

But as yet most people are ignorant of these things. We have only made a beginning at studying them in a systematic way. Our educational ideals and practices at this point have not yet caught up with our civilization. Tradition has it that culture inheres only or chiefly in things that are hoary with age, and we pay homage to the elements of civilizations that are dead and gone. Now while these things need not, and should not, be disparaged, we need also to realize that there has grown up right about us a civilization that is no less worthy of study and comprehension. In a measure, of course, we are beginning to realize this. The economic and social sciences already have a place in our schools and colleges,

and technical and commercial high schools, or technical and commercial courses in high schools, are becoming frequent. There is at present also a movement on foot for the establishment of industrial training and vocational schools for all grades of pupils. But the value of this training is seldom appreciated in its full extent. It is thought to be primarily, almost solely, utilitarian, and its socializing and liberalizing values are overlooked. There should, however, be nothing incongruous about a person taking an industrial subject for general educative purposes, just as he takes history, language, or science. But vocational and professional work, to be broadly educative, must rest upon a scientific or theoretical foundation. We cannot expect much in the way of socializing and liberalizing influence from work that does not go beyond activities that are primarily routine and manual, and it must be frankly admitted that a broad education and vocational training cannot both be extensively acquired by the time a child is twelve or fourteen years of age.

Political economy systematizes the facts of commercial and industrial life and gives them form. The business world is its laboratory, just as social life is the laboratory for ethics. In the past it has been too exclusively formal, spinning its theories quite regardless of actual conditions, and its relation to industrial and commercial education is not yet always sufficiently close. Educationally it shares in the practical, socializing, and liberalizing values. More than any other subject, it gives a genuine insight into such problems as those of capital and labor, labor-saving machinery, business and industrial legislation, banking and finance, supply and demand, and reciprocity, free trade, and protection, all of which are fundamental for intelligent and responsible citizenship.

CHAPTER XII

THE EDUCATIONAL VALUE OF THE NATURAL SCIENCES AND PHILOSOPHY

81. Mathematics. The form subject that is involved in all the sciences, both as to content and expression, is mathematics. The branches of this subject that are needed mostly by the general student are arithmetic, algebra, geometry, and trigonometry, but calculus and analytic geometry may also concern him.

The opinion is becoming more and more widespread that the prevailing conception of the educational value of mathematics must be revised. Mathematics has gained and maintained its place in the curriculum largely on the basis of the traditional disciplinary value, and since that has become undermined, the subject has been lauded because of its far-reaching practical and preparatory values. It is assumed that mathematics is extensively used by every one and so must be extensively taught. Other forces that tend to keep it largely represented in the curriculum are its teachableness and the force of tradition. Tradition, which acts through various channels, always makes it difficult to curtail or eliminate a subject that has had a long and honored career, even though the conditions demanding the subject have changed. The teachableness of a subject is seldom explicitly recognized as a force that tends to maintain the subject in the curriculum. Yet it undoubtedly is such a force. A subject

like mathematics that is clear-cut and definite and deals primarily with symbols is readily managed in the school room and gives results that are also clear-cut, definite, and measurable. This acts, more or less consciously, as a selective force in favor of the subject. But not alone mathematics is influenced by this force. It applies to all the form subjects and to the more definite content subjects, such as language and physics, as well. A subject that does not give definite results in our present educational system naturally tends to be eliminated.

The two main values of mathematics are admittedly the practical and the preparatory. The practical value is quite universal, being second only to that of the mother tongue, but like the practical side of the mother tongue, it is confined for people in general to the elements of the subject. Every one finds use for knowing how to count; how to add, subtract, multiply, and divide; how to handle common and decimal fractions; and how to apply these processes in the denominate numbers pertaining to weights, to measures, to mensuration, and to United States money with its applications to interest, profit and loss, etc. Beyond this the practical value does not go for the average person, although it does for the specialists in science and in engineering. Both of these need mathematics extensively as working tools. The extent to which the engineer needs it is well known, but the common assumption that among the scientists only the physical scientist needs extended mathematical training can no longer be held. The social and biological sciences are also becoming highly mathematical, and the workers in them must be extensively equipped in this subject. But this equipment need not be extensive for the general student in any of the

sciences. It is becoming recognized that the high school sciences should be taught primarily from the "nature study" point of view. They should put forward the content, instead of the mathematical side, and this is now quite generally done. A little mathematics beyond arithmetic is needed for this, but not a great deal.

Mathematics has some sentimental value, but only for people who take pleasure in exact mental exercise and in the contemplation of mathematical relations. There are students for whom algebra, geometry, trigonometry, etc., are their own justification. These subjects appeal to them because of the intellectual satisfaction they supply, and such students should of course be given opportunity to indulge their taste. But as these are and should be the students who become the specialists in mathematics, exact science, and engineering, no individual account need be taken of them. The liberalizing value of the subject appeals to this same class of students. It is more general in its character than the sentimental, but it also appears to be effective only for certain minds, and only when the subject is exceptionally well taught. Algebra generalizes the conception and manipulation of numbers, and geometry and trigonometry give a liberalizing insight into certain mathematical relations that obtain in one's environment. These effects are worth gaining, especially for those who have a taste for mathematical relations, but it may be questioned that these subjects should be prescribed for this reason.

In view of this analysis, it becomes evident that we have been prescribing mathematics too generally. "All over the United States, for example, girls are studying algebra and geometry, giving thereto a large part of

their learning energy. Have we the slightest proof that in this case the results are worth while?"[1] Remembering that for want of time a number of available and important subjects must necessarily be omitted, should mathematics, beyond arithmetic, be required of *every* high school graduate? Could the essentials of algebra and geometry be so combined that they could be taught in one year, and then have one year of mathematics prescribed in the high school?

The combination of the essentials of the various mathematical subjects in the high school is apparently being successfully achieved in the recent movement toward concreteness and correlation in the teaching of secondary mathematics. This movement bids fair to make high school mathematics inherently more valuable for the general student. In gaining concreteness, however, it must not be forgotten that mathematics is a form, and not a content subject, and correlation must not be allowed to crowd out logical organization.

82. The Physical Sciences. The physical sciences are represented by chemistry, physics, and astronomy. Their chief value for the general student is the cultural, but they possess this in their own peculiar manner. They serve to acquaint a person with the physical phenomena in his environment, thus putting him in harmony with them — a liberalizing effect — and giving him greater appreciation of them. These phenomena are so close to every one that the value of knowing them is correspondingly enhanced. This may be best illustrated by means of physics. Light, heat, and other forms of energy are all about us, not only in their raw forms, but also in applied forms. The person who does not, in fundamen-

[1] *School Review*, xvi, 589.

tal principle, understand the steam engine, motor, dynamo, electric lighting, telephone, telegraph, microscope, telescope, and similar instruments cannot fully appreciate these elements of his environment and cannot assume an intelligent relation to them. The freedom of his mental life is curtailed. He is living among unknown objects, but his superficial acquaintance with them hides his real ignorance. His deeper intellectual needs may also remain unsatisfied. Man has ever been curious to understand the structure of matter and the nature of the forces that play about him, and to have that curiosity in a measure satisfied is no small reward. Irrespective of the applications that are made of these phenomena, we wish to understand them, and physics and chemistry give us the most assistance toward a rational understanding. The structure of matter as revealed by chemistry and assisted by physics is to many minds fascinating. It borders on the ultimate and partakes of some of its mystery.

But physics and chemistry should do more than impart a knowledge of general principles. These subjects form the basis of most of the useful arts and conveniences on which our civilization rests, and it is to these that they should introduce the student. Text-book and even laboratory physics and chemistry are formal. To become truly educative, these must be supplemented by frequent excursions to places where the principles studied are applied. The student should be led to see what use the world is making of these principles and to feel that he understands these uses. Only in this way can their educative value be maximally attained.

The practical value of physics and chemistry is especially great on the social side. It comes to people indi-

rectly through municipal and corporate enterprises, but for the large number employed in these enterprises it is directly practical also. They need a knowledge of these subjects to enable them to do their work efficiently, and also to give them plasticity. The routine worker who knows in a mechanical way only the process in which he is immediately engaged is frequently not self-helpful even in his own small sphere, because he lacks the knowledge of scientific principles on which to base insight into difficulties; and when necessity constrains him for any reason to do a somewhat different kind of work, he is still further handicapped. Without a grounding in scientific principles he lacks the plasticity that scientific insight gives.

Astronomy is less practical than physics or chemistry, and for this reason it has been almost eliminated from the curriculum of the schools. The slight knowledge of the stars that may be helpful in navigation is needed by only a few and can be incidentally acquired; and for the determination of time and of the appearance of eclipses society has learned to depend on a few professional astronomers. The need for a knowledge of astronomy is still further curtailed by the fact that a little about the sun, moon, and planets is learned in geography, and by the fact that the stars are too remote to be felt as a part of one's environment with which one ought to be intimately acquainted. Historically, the scientific pursuit of the subject has had much to do with freeing the mind from superstitious fear regarding heavenly phenomena, but this freedom is now transmitted as a part of the social atmosphere, quite regardless of exact knowledge on the part of those who inherit it.

Apparently the only reason remaining for the study

of astronomy is the cultural. It appeals to the emotion of grandeur probably more than any other subject, and so its phenomena are inspiring to contemplate. Instruction in the subject, however, is usually so formal that even this value is largely lost. In order to obtain it, direct study of the stars must be included. The student should be led to observe the stars and to become acquainted with them. He should learn the name and location of the first, and of some of the second magnitude stars, and also of the leading constellations and their associated myths. This might, indeed, be taught as a part of nature study in the grades, especially during the winter months, when the heavens are most beautiful and when the stars appear early in the evening. This amount of knowledge should certainly be looked upon as the rightful heritage of every one. It enriches the life of the possessor directly by giving him an intelligent appreciation of some ever present, although physically remote, elements in his environment, and indirectly by giving genuine meaning to many literary allusions. On the liberal side it sets the mind free in this vast universe of ours, an effect that alone would make the study of the subject worth while.

83. The Earth Sciences. The earth sciences that concern the general student are mathematical and physical geography and geology. Mathematical and physical geography are intimately connected with social, commercial, and political geography, serving to organize and rationalize them. Their values are therefore preparatory and liberalizing. The introduction that physical geography gives to the sciences taken later is quite negligible.

Geology has a practical value in the hands of the

specialist, and serves society through him, but for the general student it must be defended almost entirely on the basis of its cultural value, which it possesses in no slight degree. It makes the earth intelligible in its past and present life. Dynamic geology makes explicit the forces that are now operating to change the face of the earth, and historical geology reveals the earth's wonderful antiquity and the changes through which it has passed. To one possessed of this knowledge, every rock, gorge, hill, mountain, and stream have added meaning. The appreciation of the earth's geologic history has profound sentimental value.

84. The Biological Sciences. Under the biological sciences we have mentioned botany, zoölogy, bacteriology, and physiology. These four subjects do not exhaust the list, but they are the ones with which the general student is most concerned. In general, they serve to acquaint the student with the biological aspects of his environment, with which he comes in contact more or less intimately every day. Their place in education is well established, and is justified by the cultural, social, practical, and preparatory values. In these values they all share, although not equally.

For the general student the cultural value, both in its liberalizing and sentimental aspects, should be placed first in botany and zoölogy, and the practical and social values in bacteriology and physiology. The æsthetic value of plants and flowers is universally recognized. Everybody enjoys them, whether versed in botany or not, and while the knowledge of that science may not enhance that enjoyment for all who possess it, it certainly does for the majority. Those who do not have their æsthetic appreciation increased thereby, if such there be, never-

theless gain the liberalizing influence of this knowledge and a worthy type of intellectual diversion.

If it is granted that the cultural value is the chief one to be derived from botany by the general student, it is manifest that this subject is seldom taught from the right point of view in the primary and secondary schools. This value implies a broad and sympathetic acquaintance with plants and flowers, which can be obtained only when the "nature study" point of view is uppermost. Dissection of plants in the laboratory and the keeping of note-books have their place in furthering this acquaintance, but they are now frequently carried much too far. They are allowed to crowd out the real knowledge of the plants themselves, and the student of botany leaves the class with but little more knowledge of the plants in his environment than he has before entering. To be fully assimilated and appreciated, dissection and the morphological and physiological studies should follow and form the capstone of the "nature study" knowledge. When the latter is adequately imparted in the grades, the former may well be given as a part of the high school course. Systematic and intensive knowledge should not be omitted, but it should be based upon, and accompanied by, a broad general acquaintance with plants.

The practical value of botanical knowledge is not great for the general student. In the main this knowledge concerns him only in the care of house and garden plants, and even this aspect might be legitimately included under the sentimental value. The farmer and fruit-grower, however, are beginning to profit by botanical knowledge. Agriculture is rapidly becoming scientific and is thereby being made more effective. The botanical principles that are used are special rather than general,

but they can be made fully effective, as well as liberalizing, only when based on a general knowledge of botany. For the general student agricultural botany has the social value through helping to furnish an appreciative acquaintance with a large, necessary, and honorable industry.

Another social and moral gain from botanical teaching is pointed out and emphasized by Professor Lloyd (46 : 21 f. and 77 f.). This is the approach it gives to the "complex and elusive" social problem relating to sex. Botanical teaching should be utilized, Professor Lloyd maintains, "in discovering to the general student the fundamental fact of reproduction in a clear and unhampered way." Botany obviously serves this purpose better than zoölogy, and the teacher is under moral obligation to discharge his duty in this respect. Knowledge, while never a cure-all, is nevertheless a most potent safeguard of body and mind, here as elsewhere.

The preparatory and introductory values of botany can be best considered in connection with zoölogy, under the term "biology." Zoölogy, indeed, possesses these values in a greater degree than botany. Neurological, psychological, and sociological phenomena are all ultimately biological, and can be approached effectively only through biology. It is furthermore true that even the problems of philosophy and religion have large biological aspects. Ultimately, physics and chemistry are also involved in these problems, for it is being seen more and more that matter, life, and mind are all aspects of the same fundamental unity. But for the general student the principles of biology are sufficiently fundamental in furnishing a basis for the understanding of mental and social phenomena, and they form a necessary phase in the philosophic insight of all.

Reference was made in the introductory chapter to the fact that biology introduces the student to the evolutionary point of view, without which one cannot have a sympathetic appreciation of modern culture. Biology is not the only science that serves as such an introduction, but because of the absorbing interest that man himself has in this view-point, being himself the highest product of the animal series, it is best approached through a knowledge of this series. Embryology and historical geology form strong supports to zoölogy at this point. In teaching zoölogy, however, to the young student, the teacher must make it one of his conscious aims to impart a knowledge of the doctrine of evolution. Unless this is done, all its value in this direction may be lost, for incidental learning is treacherous.

While elementary physiology should precede biology and so be introductory to it, a profound knowledge of physiology must be based on biology. Much of human physiology may, indeed, be taught in connection with biology. This brings out the comparative point of view which is everywhere so valuable.

The practical value of zoölogical knowledge touches the majority of mankind only indirectly. It is discussed in the following words by Bigelow : —

The value of animals in the food-supply is not directly affected by widespread knowledge of zoölogical science, for at most such knowledge would be of direct practical value only to the relatively few who are able to apply it in the supplying of animals for food. But the problems of the food-supply are of such importance that we must believe that there is a general interest in them and especially in the attempts to increase the supply by the application of scientific principles gained from the study

of animals. A knowledge of the general facts of zoölogy will do much towards making the average citizen appreciative of the work in this line, especially that of governmental departments, such as the United States Department of Agriculture, the United States Fish Commission, and the various State agricultural stations and fish commissions.

Besides the value of animals in the human food-supply, there may be mentioned the useful domesticated animals and the animal products other than food. These are aspects of animal economics which should arouse at least an intelligent interest on the part of educated citizens.

Then there are the numerous animals which are directly opposed to the interests of man. The economic importance of this aspect of zoölogical knowledge is evident when one inquires into the monetary value of crops and domesticated animals which are annually destroyed by such animals as insects, rodents, and parasites (46 : 248).

The remarks that were made in connection with the cultural value of botany, and the manner in which it should be taught, apply also to zoölogy. On the sentimental side this value of zoölogy is probably less than that of botany for most people, while on the liberalizing side it is greater.

Zoölogical knowledge is vital and far-reaching in its rationalizing and liberalizing influence. This is because man is a member of the animal series, and therefore can understand himself and his institutions fully only through a knowledge of that series. Many animals are beautiful in their outline, color, and movements and are appreciated for these qualities, but much of the interest that people take in them has its source in the fact that

they are actively alive. We are instinctively interested in all things that are alive and move, partly because of incipient fear, but mostly because our social feelings are aroused. This interest may be somewhat enhanced by knowledge, but probably not a great deal. Being emotional, it is properly classed as a sentimental value. Zoölogical gardens owe their popularity to it, as well as to the æsthetic qualities of animals.

Bacteriology is an aspect of biology that is worthy of independent designation and study. Although developed but recently, it already possesses a value second to no other science from a practical standpoint. By means of its knowledge, specialists are curing the diseases of men, beasts, and plants, and they are improving our water-supplies and the palatableness and healthfulness of our foods. It is true that these values touch most people indirectly, so that a knowledge of the science is not demanded of them, but some knowledge should unquestionably be general. In relation to personal hygiene it is beneficial for all, and it serves the social good by furthering remedial legislation and the efforts of specialists generally. What is needed for the general student is a brief introductory course requiring but little technic. A course of this nature should find a place in every high school, and might well be a part of the course in physiology and hygiene. It would there form the logical capstone to the didactic hygienic instruction given in the elementary school.

Physiology must be defended mainly on its practical and preparatory values, but because it is concerned with our bodies, it seems that we should be interested in it also for cultural reasons. It should form the foundation and the capstone for zoölogy and so share in its values. Per-

sonal hygiene and the intelligent care of the body are directly influenced by physiology.

85. The Mental Sciences. The mental sciences take as their province the phenomena of consciousness, which are a special phase of the biological sciences. They may all be discussed together under the head of psychology.

Psychology holds practically no place in the secondary school, and is elsewhere pursued almost solely by those who are preparing to teach. This indicates that only its preparatory value is receiving recognition. Teachers need it in order to gain an intelligent insight into educational theory and practice. Next to teachers, it is studied by alienists, who need it in treating the insane, and many are now advocating its introduction into medical schools. Physicians in general, and specialists in nervous diseases in particular, could certainly profit by psychology. In regard to the evaluation of evidence, it should be of no small value to the lawyer and jurist. The students of sociology and philosophy need it very definitely, and so does the clergyman. For the general student the science is becoming more and more valuable as it is being further developed, especially on its physiological and experimental sides. It bids fair soon to render valuable service in the reading of character and in determining future vocation. When further developed, its cultural values, too, will become more pronounced.

86. Logic. Logic and ethics are usually classed among the philosophical subjects, and so far as this is done for convenience in teaching, the practice is on the whole justifiable. But these subjects do not deal with ultimate relations any more than do mathematics and æsthetics, and so do not logically belong to philosophy. They are form subjects that are most intimately connected with the social

and natural sciences. Logic is nothing but a systematic presentation of scientific method. It generalizes the methods by means of which reliable knowledge is acquired both in and out of school. This gives it first of all the liberalizing value, but this value cannot be gained from the subject in any significant degree unless it is preceded by a somewhat extensive study of the content subjects, especially of the sciences. This lays a basis for the generalizations with which logic deals and so makes these generalizations significant. Without this basis the subject is abstract and meaningless. For the teacher, and in a slight degree for the lawyer and the scientist, the subject has a preparatory value, but for the general student it must be defended entirely on the basis of its liberalizing value.

87. Philosophy. The observation has been made a number of times in the preceding pages that every subject should be looked upon as involving content, form, and expression. The teacher should always bear in mind all three aspects when teaching any one of the subjects. But this does not exhaust the range of interrelationship that exists between the subjects. Referring to our outline of the curriculum (p. 179), we may say that the subjects are related not only horizontally, but also vertically and diagonally. History involves geography, and geography involves history. Æsthetics, ethics, and logic all involve psychology, and so do sociology, anthropology, and philosophy. These interrelations are recognized in education under the head of the correlation of studies and are treated in the Principles of Teaching. From our present point of view they are all involved in the preparatory and introductory values.

The group of studies that is related most intimately

and completely to the other subjects is the philosophical. It involves them all, and has no content that is distinctly and solely its own. The whole field of knowledge and action is its domain. The ultimate nature of all content or reality, of which the other subjects have given us but partial and superficial views, is dealt with in metaphysics, and the relation of knowledge to reality is the problem of epistemology. Religious life, or conduct in the broadest sense, is the expression of man's attitude toward the world that has become his conviction. It depends on all that he knows, feels, and believes, and so forms the pinnacle of the curriculum and of life.

Being dependent upon, and forming the unity of, the other subjects, philosophy should naturally come relatively late in the course. It requires both extensive knowledge and experience for its appreciation. Its value arises out of its synthesizing effect and the enlarged point of view that it conveys. It reveals the world as a progressive, evolving unity in which law reigns supreme and in which there is nothing capricious. When correlated with ethics, history, and the doctrine of evolution, it reveals the world as a moral order. Its chief value, therefore, is the liberalizing, but it possesses also the sentimental and social values. The liberalizing value it possesses above that of any other subject, or rather, it completely releases the liberalizing influences of the other subjects. The student beginning the study of metaphysics usually finds that his mental structure must be largely reconstructed. It contains many false columns that must be removed, and others must be placed into new and heretofore unrecognized positions. Some things that were thought to be primary and in

dispensable are seen to be secondary and insignificant, and others are correspondingly exalted.

By leading to a more profound understanding of man and his place in the world, philosophy has a socializing influence, and the conceptions that it imparts appeal both to the æsthetic and intellectual sentiments. It calls for the exercise of the highest intellectual powers, those dealing with abstractions and subtile distinctions, which makes the subject a difficult one for certain types of mind, but a correspondingly interesting and fascinating one for other types. On the side of expression it appeals primarily to the heart and so is of concern to every one.

EXERCISES

1. What studies would supply the need implied by the following: "I am profoundly convinced that the greatest educational need of our time, in higher and lower schools alike, is a fuller appreciation on the part of the teachers of what human institutions really mean and what tremendous moral issues and principles they involve." — N. M. Butler.

Discuss the following evaluations: —

2. Grammar (1) cultivates the power of discrimination, (2) promotes the study of the mind, and (3) should illustrate the difference between knowledge and opinion. — Gordy.

3. Nature study (1) increases our interest in nature, (2) develops our realization of law and cultivates open-mindedness, and (3) incites to specialization along the lines of natural bent. — Gordy.

4. History (1) increases one's knowledge of himself and his fellows; (2) develops sympathy and charity; (3) makes us realize that nations, like individuals, must act in accordance with the moral law; (4) prepares for citizenship, (a) by the knowledge it imparts, (b) by developing a certain kind of reasoning power, (c) by fostering a high civic ideal. — Gordy.

5. From the educational contents of zoölogy we may formulate two aims which should govern the teaching in the secondary school. First, the aim to teach zoölogy so that it will afford good scientific discipline should be the very foundation of zoölogical teaching. Second, it should be the aim to present the information — practical, intellectual, æsthetic, or moral in its bearing — which seems most valuable for liberal secondary education. — BIGELOW.

COLLATERAL READING

BUTLER, Meaning of Education, 17–34; 164–183.
DE GARMO, Principles of Secondary Education, I, 65–161.
GORDY, A Broader Elementary Education, 241–289.
HORNE, Philosophy of Education, 103–145.
MÜNSTERBERG, Psychology and the Teacher, 271–304.

CHAPTER XIII

THE ADMINISTRATION OF THE CURRICULUM

88. Curriculum and Course of Study Distinguished. It has been our aim in the last three chapters to give a systematic exposition of the curriculum in its entirety and to discuss briefly the educational value of its leading parts. No attempt was made to fit it into the schools in the form of a course of study. In fact, as used in these chapters, the idea of the curriculum should be distinguished from the idea of the course of study. By the curriculum is meant the logical, complete, and unified conception of the studies and exercises of the schools regardless of their administration, while by the course of study is meant the arrangement and grouping of these studies and exercises for the purpose of bringing them effectively to the learners. In this sense, only the consideration of the curriculum belongs to the Principles of Education, while the working out of the course of study belongs to School Management and Administration. But the Principles of Education is concerned with the fundamental principles underlying the course of study, and it is to these that we now turn. We shall consider them as pertaining to the topics of general culture and vocational and avocational training.

89. Our School System. The various exercises of the curriculum are transmitted to the students through the elementary schools, high schools, colleges, and universities. A casual glance at their several activities does not

reveal the fact that each has a specific function to perform, or that the educative process falls into logically distinct, although consecutively related, divisions. Each school appears to be a finishing school, and so seems to be related to the one next above it only as a matter of convenience. Distinct functions and inherent relationships are not apparent.

But distinct functions and inherent relationships no doubt do exist. They become evident when we look beneath the dividing lines that historical development has drawn and that have become conventional, and group all schools under the three heads of elementary,[1] secondary, and higher schools. Instead of drawing the dividing lines at the end of the eighth, twelfth, and sixteenth school years, as is now done, they fall more logically near the sixth and fourteenth school years. The first division ending with the sixth grade gives us the section belonging to elementary or primary education, the next division ending with the sophomore year in college gives us the section belonging to secondary education, and everything above that may be classed as higher education. The precise school years at which the dividing lines are drawn are not significant, but it is significant that each one of the divisions has a distinctive, although not an exclusive, function. If this were the case, the efficiency of the school system would be increased in several ways. Instruction could be made more definite, and it might well be that a school system thus logically integrated would save from one to two years of the student's academic life. The present unrest in regard to the rela-

[1] The term "primary" would be logically preferable to "elementary," but it has by custom been restricted to mean the first two or three grades.

tion of the high school and the grades, the high school and the college, and the college and the professional schools, is a symptom of our illogical arrangement.

90. The Function of Elementary Education. The distinctive function of the elementary school should be, and in the early years now is, to impart the tools and conventionalities of knowledge, to lay the apperceptive basis for later academic acquirements, to ingrain such social and semi-social habits as those of politeness, promptness, cleanliness, obedience, honesty, and helpfulness, to awaken the capacities of the child, to exercise his initiative and his creative power, and in general to provide the conditions for a happy and joyous child life. Objective acquisition and subjective expression, although correlative and inseparable, should both be present as ends in the teacher's mind.

The intellectual conquests of the race cannot be appropriated without the possession of certain tools or instruments. A person must know how to read, write, spell, figure, draw, and construct, and he must know some elementary facts of composition and grammar; he must know the conventional technicalities of maps, dictionaries, and other books of reference; and he should possess the basal concepts of geography, history, literature, art, and science. The basal concepts of science are, and should be, acquired in nature study; those of art from the study of drawing, pictures, and song; those of literature from fairy tales, myths, folk-stories, simple poetry, and other exercises pursued in the reading class; those of history from the study of history stories and biography; and those of geography from home geography and the elementary text-book. The concepts pertaining to civil government and personal hygiene may

be taught to the class in general exercises, or may be treated in connection with history and nature study respectively. To these studies the pupil is only introduced by the elementary school period here designated, and the impression should not be allowed to prevail that anything is actually finished. Very little that has a specific vocational bearing can find a place in this school, although of manual and constructive work there should be an abundance.

91. The Function of Secondary Education. Just as the distinctive function of elementary education is to impart the tools, conventions, and basal concepts of knowledge, so that of secondary education is general culture. It is the function of this period to elevate the individual into the life of the species by giving him possession of those elements of life that it is the prerogative of man to possess. This is the period that is devoted primarily to making the student broadly acquainted with the environment in which he lives, to the end that he may have added appreciation of it, increased harmony with it, and intelligent mastery over it. Its central aims are the broadening and enriching of life, and the socializing of the individual through insight and participation. The subjects of study concerned are the humanities, the natural sciences, and philosophy, which we have discussed.

On the subjective side secondary education means that the student's powers should be developed and be organized into efficient instruments of action, and that he should be stimulated on all sides so that he may discover his own capacities, both for the sake of choosing a vocation and for the sake of avocational enjoyment. An all-round acquaintance with one's environment naturally

means an all-round stimulation of one's capacities, but the organization of the student's powers must be specifically aimed for in the methods of instruction and in those features of the school work to which the word "training" is properly applied. Under this head come the student's habits that are indicative of refinement and culture, his methods of thought and study, his promptness and accuracy, and his ideals of moral and social conduct.

General culture has been the function of the secondary school throughout history, and, with the occasional exception of the university, this school has always been more systematically provided for than any other. At Athens general culture was imparted in the palæstra and the music school, especially the latter, and at Rome in the school of the Grammaticus, which were all secondary schools. The secondary school was the first one to arise out of the intellectual darkness of the Middle Ages. In Germany this school has developed into the Gymnasium, in France into the Lycée and the Collége, and in England into the Grammar Schools and the great Public Schools. In all these countries the span of secondary instruction extends now from about the tenth to the nineteenth year of the student's life. The student has to know how to read, write, and figure when he enters, just as he had to at Athens and at Rome.

In our own country the secondary school was again the first to be formally established. The colonists were eagerly solicitous about the learned professions, especially the ministry, and set about to organize schools in which the Latin language was primarily taught. These were the Grammar Schools, and they were patterned after the Grammar Schools of old England. When

these schools proved inadequate because of the narrowness of their curriculum, they were supplemented in the second half of the eighteenth century by the Academy, which soon supplanted them altogether.

The High School was not started to compete with the other secondary schools, but to supplement the instruction given in the elementary or common schools. It was the outcome of the needs of a prosperous democracy. The Grammar School, and to a certain extent the Academy, existed for the middle and upper classes, just as the typical secondary schools do now in Europe, and the elementary school developed for the lower classes. The elementary school was meant to be a finishing school, as the *Volkschule* is in Germany, but since the middle of the eighteenth century there has been a steady tendency away from social strata and class education toward democracy and a common educational ladder. The establishment of the High School was the first move toward extending public education upward from the common school. The first High School was established in Boston in 1821. It was first called the English Classical School, but the name was later changed to High School. The school was established for those graduates of the elementary school who did not wish to go to the university, and so enter the Latin School, but who did have time and inclination for further study. It was thus literally established as the people's college.

Other cities soon followed the lead of Boston, and the High School, instead of remaining merely the "people's college," has assumed also the preparatory function, and has come to bridge the gap between the elementary school and the college or university, thus completing the educational ladder. This development has been largely uncon-

scious, and has paid no heed to the logical distinctions between elementary, secondary, and higher education. It adapted itself to conditions that were already in existence when the High School appeared.

Owing to the limitations of our secondary schools, American colleges have never consistently taken the students at the end of the secondary school period, as is done by the German universities, for example, but a number of years earlier. This makes the system less perfect than it might be, but at the present time a readjustment between the different schools is taking place, and we may in time expect a smooth-working system in which each part will have a logical and distinctive function to perform. The system could, indeed, be more perfectly articulated than it now is by properly distributing and correlating the work, even though present dividing lines were not changed.

92. **The Function of Higher Education.** If it is the function of secondary education to impart general culture, what, then, is the function of higher education? A careful examination of conditions as they exist reveals the fact that it is professional training. When the student has finished the secondary school period, and has discovered his capacities, he is ready to enter upon the preparation for one of the learned professions; and it is the distinctive function of the university to give this preparation.

The extent to which our larger universities have already moved in this direction is concealed, first, by the fact that they still retain considerable secondary work in the earlier years of the course; and secondly, that training for the calling of teaching, or of special research, is marked off in the public mind from training for the

calling of doctor, lawyer, or engineer. In reality, the kind of training that students receive to make them professors, or directors of laboratories is, of course, as professional as that of the school of technology or medicine (15 : 102).

When the freshman and sophomore years of the college are omitted in our considerations, the professional nature of the university is at once evident. The professional work in the teachers' course is begun in the junior year quite universally, and the technical work in law, medicine, and engineering also begins at about that time. Some academic work may, and no doubt should, continue alongside of the professional work. General culture is not something to be gone through with and then permanently laid aside.

Another question that presents itself at this point is the establishment of a university or association of scholars above, or supplementary to, the type of higher education just outlined, the primary function of such a university to be the extension of knowledge. The prevailing custom so far has been to let the teachers in the higher institutions of learning carry on the work of instruction and research side by side. In this scheme the work of instruction is essentially primary, while that of research assumes somewhat of an avocational aspect, as well as becoming a means of preferment. The brilliant research scholar brings distinction to his university and is sought after.

A college or university devoted primarily to research and investigation has long been the dream of scholars. Bacon, in "New Atlantis," outlined an institution of this kind, calling it Solomon's House, and Comenius made a similar institution the capstone of his ideal educational

system, giving it the title of the College of Light. In modern times this ideal is being realized by such activities as the Vilas bequest to the University of Wisconsin, the Carnegie Institution of Washington, the Rockefeller Institute for Medical Research, the scientific departments of governments, and by the graduate departments in all our leading universities.

93. Social Prescriptions. The course of study outlined so far applies only to those members of society who are preparing to enter the so-called learned professions, or who for some other reason want extensive culture and can afford the time and expense that it entails. The great majority of people have neither the time nor the inclination for such extensive culture, and, while this culture might be desirable for personal reasons, for the callings upon which these people wish to enter, society does not demand it, and probably never will. The educational prescriptions, although not the educational opportunities, that society makes are always related specifically to its own welfare. It is necessary, for example, that the social leaders in law, medicine, engineering, and teaching be extensively trained so that social interests may be safely intrusted to their hands. Ignorance in any one of these classes would be sure to produce widespread injury and waste of effort. But when callings, such as farming and manufacturing, are not likely to prove injurious to society because the persons engaged in them are lacking in school training, society does prescribe educational qualifications to enter them. These callings may, however, be hedged about by other restrictions, such as pure food and factory laws, but these do not concern the school as directly as do the educational qualifications.

94. Vocational Training. The fact that people do not all pass through the entire course of study greatly complicates the administration of the curriculum. Provision has to be made for people to pass out into the vocations of life at practically every stage above the elementary period. In the immediate past, little in a vocational way was done by the public school for this class of people. For this fact the school has often been blamed, but probably not with entire justice. The financial resources at the disposal of the school have always been limited, and therefore the choice has rested really between vocational training and a certain amount of general culture. Now of these two the latter has rightly been regarded as the more precious. Vocational training was obtainable by the apprentice system and otherwise in the actual callings of life, but general culture, which is certainly no less essential in producing a worthy and efficient life, is seldom so acquired. Unless supplied by the school, this would be permanently omitted from the lives of most people. The slogan that all people should be given equal opportunity for vocational preparation in the school is thus seen not to have been entirely fair. The school may be one opportunity for offering such training, but only one. If it is socially more expedient to acquire certain types of vocational training outside the school, society is not obliged to provide for this training in the school also. The training required for the learned professions cannot be efficiently picked up in practice, but as society needs these professions, it must provide for them by means of the school. On the other hand, many other vocations may still be efficiently acquired in practice.

But the concentration and specialization of industry

and the advancement of applied science are making it ever more difficult to acquire certain callings in practice that have been formerly so acquired, and as a result there is now a definite movement on foot toward vocational training given either in the existing public schools or in separate schools. Instead of professional training only at the end of the secondary period, it will have to be provided at a number of stages in this period. It will then be as easy to pass into a vocation along the way as it now is to pass into one of the professions at the end of the school course. The amount of prerequisite academic or scientific training for the various vocations will have to be determined separately for each case, or class of cases. It will no doubt begin rather low and then be gradually increased, as has been the case in the professions.

This movement is sure in time to prove an added educational, as well as a vocational, opportunity for many. When it is realized that continuing in school will give increased opportunity for desirable employment, more will remain there and for a longer time than is now the case. This added time will be spent not merely in vocational training, but also in the sciences underlying this training, and in a study of the social functions that the vocations should properly discharge. Such training will be distinctly liberalizing and socializing, and this will make vocational education genuinely educative. Art and literary subjects will also find their way into the curriculum and contribute their specific values.

The general educative effect produced by the vocational courses will depend primarily on the spirit in which the work is done, for all subjects when approached

from the rational and human, instead of the sordid, point of view yield social and liberal influences. The head and the heart must be put into the work as well as the hands, and when this is done, the life-realizing value of any vocation is subject only to the tastes and capacities of the individual concerned. Any training is liberalizing that liberates the mind through insight into principles, and any training is socializing that makes the heart go out to one's fellows. Whether vocational and industrial education will be cultural or not will depend far more on the teachers and the spirit in which they teach than on any other consideration involved. To emphasize the liberal and social aspects, and to subordinate the sordid, will be more difficult here than in the general culture subjects, but we may confidently expect that our teachers will be equal to the task.

The solution of the problem of vocational training, and of industrial and commercial education, is greatly aided by the recognition of the fact that we can educate *through* commerce and industry as well as *for* them. This being the case, it is unfortunate that academic, commercial, and technical high schools are separated from one another as they now so often are. This fosters class distinctions and removes the possibility of electing certain subjects from each group of students. The unity of our democratic society and our educational system would be better maintained if we had less separation and traditional discrimination in our general culture schools, a class to which all public high schools unquestionably belong, even though they contain vocational subjects and vocational courses.

95. Avocational Training. In connection with vocational training, the antithetical question of avocational

training may also be logically raised. Granted that vocational training be assigned a definite place in the curriculum, should avocational training receive similar recognition? In answer it may be said that everything now in the curriculum, including even the vocational work, may be put to avocational uses. What are the leading functions of art, music, literature, and of much of history, science, philosophy, and constructive work but to increase the capacity for the noble enjoyment of leisure? The manual and routine worker may find opportunities for compensating recreation and growth in work that is of a more intellectual nature, while the brain worker may perhaps maintain his balance best by making furniture and other things in a little shop in the attic or basement of his home. The more emotional provinces of literature, art, and music may be shared by both. The person whose vocation takes him outdoors may find his avocation in an indoor employment, while the indoor worker may perhaps best recuperate himself in outdoor sports. One's vocation as a rule exercises but a part of one's self, and it is necessary from the points of view of both health and efficiency to be able to engross one's self in some compensating avocational activity.

Avocational training involves the question of the permanency of school interests. The criticism is sometimes made that the work of the schools is defective because the interests that are acquired in school are not permanent. Thorndike, for example, says: —

> The chief defect of school instruction with respect to acquisition of interests is that, as a consequence, they are not permanent. Interests are present under the stimuli of school life which die out soon after it is completed. As children we learn, but as adults we too often

lose our love for learning. The higher feelings are nourished in the protected surroundings of the college, but do not long survive the transfer to the rougher outside world and competition with the interests in money, power, and position (66 : 53).

Now it is no doubt true that as teachers we often fail to reach maximum efficiency in making worthy interests permanent in our students. The remedy for this fault lies in a clearer appreciation of the aims and values of education and in a mastery of the methods of attaining them. But as Thorndike's criticism stands, it does not fully state the case, and something may legitimately be said on the other side. It may be said, in the first place, that by no means all of the educative effects of a study are lost if an active interest in the study is not maintained after school life. To have once known a subject and to have forgotten its details is a great deal better than never to have known it at all. The person who has had a course in physics that brought him into actual contact with the physical phenomena in his environment will have his attitude toward that environment permanently changed, even though he maintains no permanent interest in the study itself. He will have been liberalized in that direction once for all, and he will always feel the force of natural explanation. The liberalizing effect of every study is largely retained even though the active study of the subject is not continued, and the same may be said of the conventional value. The sentimental value is dependent far more on continued participation, but the socializing value is again largely continuous after it has once been gained. The person who has once gained a thorough conception and appreciation of his country and of his relation thereto through

the study of history and civics is ever after a different social being. The full force of this value would unquestionably be better maintained if some active interest in these subjects were continued, say through a permanent interest in current events, but all of it would probably never be lost. The practical value, being in a high degree dependent on exact knowledge, is far less permanent, but the preparatory and introductory values are again largely permanent ones, the former less so than the latter, however.

In the second place, it should be observed that the demands and conditions of after-life are so different from school life that the maintenance of a similar breadth of interests cannot be expected. The cultivation of a broad acquaintance with life, or the development of many interests, is the business of the student in school, but in after-life the pursuit of a specific vocation becomes his chief concern. This in a large measure supplants his school or college activities and is bound to consume the major portion of his time. It becomes impossible for him to keep alive as many interests as he did while at school, and even though his love for learning should not die out, he would find no time to nourish it as broadly as he might wish.

But the alternatives are not either to keep alive all of the interests stimulated in school and college or to let them all die. We must realize first of all that one's vocation should, and usually does, keep alive some of one's higher, and even one's highest interests. The vocation will surely do this if it is properly chosen. The solution regarding the interests not included in the vocation is to keep alive the choicest ones by one or two avocational activities. The interests not maintained by

these two lines of activity should be frankly and cheerfully allowed to subside. In regard to them we may say with James: —

> Not that I would not, if I could, be both handsome and fat and well dressed, and a great athlete, and make a million dollars a year, be a wit, a *bon-vivant*, and a lady-killer, as well as a philosopher; a philanthropist, statesman, warrior, and African explorer, as well as a "tone-poet" and saint. But the thing is simply impossible (39:309).

Life is too short to maintain a great diversity of interests, and our students should be led to realize that fact fairly early. We cannot be everything, but we can be something, and this something should include the equipment for both a vocation and at least one avocation. The vocation we are compelled to choose by the conditions of existence, but we are not thus compelled to choose an avocation, and therefore it often goes by default. This makes it necessary to apprise young people of the fact that they should concentrate upon the choice of an avocation no less than upon a vocation. If it were more generally realized when there is yet time that both are necessary for a complete and wholesome life, the avocation would not so often be overlooked. The person without an avocation usually loses his vivacity, his enthusiasm, and his interest in life, and he is a burden to himself when alone and not vocationally employed. He lacks the power of noble self-entertainment, a power that must be accorded high rank in human life. In conferring this power the school has a definite duty to perform, and while it may not be necessary to introduce special avocational subjects not now in the curriculum,

the school should nevertheless make avocational training a conscious aim.

96. Effects of Education Summarized. We may now summarize the effects that the educative process should have upon the individual. Every broadly educated person may be justly expected (1) to have a general acquaintance with all the fundamental sections in the field of human knowledge to the end that he may be able to take an intelligent part in the mental life of the race; (2) to be in masterful possession of the knowledge and skill pertaining to one section of this field, to the end that he may be able to make his own livelihood and contribute to the social welfare; (3) to be a progressive student, so that he may be able to continue his own growth and to remain in harmony with an advancing society; (4) to have ingrained in his speech and conduct those elements of refinement and accuracy that are everywhere recognized as the accompaniments of culture; (5) to have assimilated as a part of his nature those truths and ideals that the race has learned to cherish; and (6) to have the capacity of elevating, or at least harmless, self-entertainment, to the end that he may not be at the mercy of the pleasures of sense or a burden to himself when alone. Although these six elements are here numbered consecutively, they should not be interpreted as holding that relation to one another. They should rather be looked upon as being of coördinate rank.

EXERCISES

1. What is apparently being done with the American college in the present educational readjustment?

2. What defense could be made for the public support of universities devoted primarily or solely to research?

3. What appear to be the social forces that have drawn, and are tending to maintain, the lines of division between schools at the end of the eighth, twelfth, and sixteenth school years?

4. What are the physiological benefits derived from relaxation and recreation?

5. To what extent is it true that the world's great men have had both a vocation and an avocation?

6. Could such games as pool, billiards, chess, and cards be rescued from their evil associations and be made more generally available as recreative agencies? Could the school assist in this?

7. Write out what appear to you the ten leading activities in which people seek recreation and enjoyment. To what extent is the school assisting in equipping people to pursue these activities? Are there any in which the school might render more assistance than it is doing?

Compare the following summaries of the effects that education should produce with the summary given in the text.

8. These five characteristics, then, I offer as evidences of education — correctness and precision in the use of the mother tongue; refined and gentle manners, which are the expression of fixed habits of thought and action; the power and habit of reflection; the power of growth; and efficiency, or the power to do. — NICHOLAS MURRAY BUTLER.

9. In a recent address President Eliot is reported to have made these four points as the result of a liberal education: —

(a) A knowledge of past and current events in the world's progress.

(b) Power of expression.

(c) An intimate acquaintance with some part of the store of human knowledge.

(d) A development of the imagination.

10. In giving his "new definition of the cultivated man" President Eliot elaborated the following four points: —

I. "The moral sense of the modern world makes character a more important element than it used to be in the ideal of a cultivated man."

II. "A cultivated man should express himself by tongue or pen with some accuracy and elegance."

III. "The next great element in cultivation is acquaintance with some part of the store of knowledge which humanity in its progress from barbarism has acquired and laid up."

IV. "The only other element in cultivation which time will permit me to treat is the training of the constructive imagination."

11. Vincent (77 : 117) enumerates "the demands which society may be conceived as making upon the individual through the process of education" as follows: —

I. "A demand that the individual exercise and develop his capacities to such an extent that he shall be able to 'see straight and clear; to remember; to express thought with precision' (Eliot), and to have the body under conscious control."

II. "That by means of language and other symbols the individual incorporate in his consciousness, so far as may be, the most general knowledge of his race, his nation, and his community."

III. "That the individual possess himself in the fullest way of some part of the social tradition, either rational and æsthetic knowledge or manual dexterity or technical skill."

IV "That the individual contribute something by way of rectifying or enriching the collective inheritance of knowledge, skill, taste, and ethical idealism."

V. "That the individual recombine and elevate in his own personality the deepest truths and best ideals of the race and nation in such a way that his conduct may be both wise and ethical, *i. e.*, in harmony with the best interests of society and of his own nature."

COLLATERAL READING

Hanus, A Modern School, 99–109.
Harris, Psychologic Foundations of Education, 321–341.
Hollister, High School Administration, 49–60.

CHAPTER XIV

THE AGENCIES THAT EDUCATE

97. The Agencies Classified. The meaning of the word "education," as this word is generally used, has reference primarily to the instruction and training imparted by the school, with perhaps a minor reference to the influences of the church and the home. But when education is defined as the adjustment of the individual to the life in which he must participate, it becomes evident that this interpretation of the word is too narrow. Education must be extended to include all those influences that tend to modify a person's future adjustments, whether they radiate from the school, the church, and the home, or not. The influences from every agency and condition of life may in this sense be educative. But these various agencies and conditions are not all equally planned with educational intent, and from our point of view they may be conveniently divided into two classes: (1) formal and (2) informal agencies of education.

The informal agencies of education include all those agencies that tend to impart knowledge and modify disposition in an incidental way. They include such agencies as social intercourse and vocational activity, whose primary function it is to achieve other than educational ends. The formal agencies include all those agencies that are definitely organized for educational ends. The primary agency in this class is the school, but the apprentice system in industry and certain aspects of the church

and the home also fall into this class. There is obviously no sharp dividing line between the two classes of agencies.

98. The Formal Agencies of Education. The motives for the formal agencies of education have been referred to a number of times in the preceding pages. The accumulation of knowledge resulting from man's developed intelligence and the non-transmission of this knowledge through the germ plasm make formal education necessary, while the period of infancy increases this necessity and furnishes both time and plasticity therefor. In man's present state of development and civilization, formal education is not a matter of choice, but of necessity. Man's life has become so complex, and its essential elements are made up so largely of material that cannot be organically, or even incidentally transmitted, that the present form of civilization and progress could not be maintained without the formal agencies of education.

99. The Evolution of the School. The evolution of the school in its details has varied among different peoples, but in general outline it appears to have been everywhere much the same. The germs from which the school has developed may be discerned in the activities of the most primitive tribes known, and it is to these tribes that we must turn for our elemental conceptions. Among these tribes we find social practices, including education, reduced to their lowest terms, which is very helpful in leading us to a better understanding of our own highly complex social life. The primitive man must in essence meet the same problems that the civilized man has to meet. (1) He has to live and so must minister to his physical needs, and (2) he has theoretical or spiritual needs to which he feels no less compelled to min-

ister. While interrelated, these two types of problems are measurably distinct, and they have remained so up to the present time.

The practical education of the primitive man consists of training in those processes by means of which the needs of food, clothing, and shelter are satisfied. These needs make an insistent demand on every member of primitive society, yet in preparing to meet them there is little that can be called formal education. The child learns the processes of warfare, hunting, and fishing, either through play or through actual participation in the activities themselves. In his play he imitates the activities of his elders, just as all children do in their play, and in a measure this imitation is necessarily educative. The child's participation in the work of the adults is not for the sake of education, but for the sake of the work. The child's services are needed to help meet the practical necessities of life, and the education that he receives is in the main incidental. He learns by imitation, and the adult has no overt or systematic plan of instruction with regard to him.

But in performing the practical work of life the child is not left to methods of his own invention. On the contrary, he is required to follow a definite and set routine, from which he is not allowed materially to deviate. Weapons must be made, animals slain, and food prepared only in the approved fashion. The reason for this is found in the primitive man's conception of nature.

The primitive man does not take things for what they seem, but back of every material object and phenomenal reality he posits an immaterial power that controls the material object and explains its behavior. The object is assumed to possess a spiritual "double"

similar to the consciousness, or spiritual self, that man himself is assumed to possess (53 : 2). This belief is called animism.

The savage does not attain the conception of animism by a process of reflection, but rather as the result of a want of discrimination between the nature of his own existence and that of other phenomena, both animate and inanimate, in his environment. He naïvely attributes to the things about him qualities and motives that he knows in himself and his fellows, and these qualities he takes for granted without analysis. When he speaks of an angry sea or a friendly wind, he is not using figures of speech, but is speaking literally. The notion of a "double" he infers from such phenomena as dreams, trances, reflections in the water, and shadows. His shadow is always a mystery to the savage, and he is able to account for it only as an attenuated other self. His dreams he interprets in a similar dualistic fashion. In them he apparently leaves his body and wanders about over the world much as he does when awake. He meets his friends, both living and dead, uses his dog, his weapons, his beast of burden, and in general has experiences with the objects of both physical and phenomenal reality. The natural assumption is that not only he himself, but also all the other objects that he meets must have doubles, for on what other basis could he meet and use them in his dreams? He did not use them in the flesh, for his friends assure him that he has not left his bed. On this assumption the primitive man acts and builds his philosophy of life.

The consequence of animism that is of especial interest to us is its relation to theoretical knowledge and education. If all the objects and phenomena in the

primitive man's environment are endowed with mysterious conscious powers, they must be treated accordingly. They must be recognized and appeased much as his friends and neighbors are recognized and appeased. But the problem of appeasing them is more subtile and difficult than it is with his fellows. It is impossible to converse with them, and their ways and demands must therefore be learned indirectly by means of trial and error. A successful accomplishment of an act is assumed to have been done in accordance with the will of the double involved, and the act must thereafter always be done in this manner. The will of the double is not easily learned, and when the knowledge has once been gained, it must be preserved. It is this that accounts in large part for the stereotyped methods and aversion to change that are characteristic of primitive life. Other forces involved are habit and social tradition, but even these are explained as being the result of supernatural powers, and are therefore sacred. The savage is thus seen to have a definite theory of the world that is not without its influence on practical affairs.

This animistic explanation of natural phenomena appears on the surface very different from our scientific account, but in fundamental essence the two are entirely parallel. Both are theoretical explanations of observed phenomena. We account for these phenomena by means of unvarying and verifiable laws and principles, while the primitive man accounts for them by means of indwelling and capricious spirits. The preference between the two must turn on the verdict of experience, just as the preference between rival hypotheses must always turn. As a working hypothesis the primitive assump-

tion is entirely commendable, and there are no *a priori* means of ascertaining its falsity. The assumption might be correct, and the primitive method of placation might be the only adequate method of controlling nature. The accumulated experience of civilized races, however, has not borne out the assumption. Animism has not stood the test of experience in these races, and has therefore been displaced by the explanations of modern science, which are standing this test. But in recognizing this defeat we need not disparage the primitive account. The consequences of this account illustrate in a forcible way that it is wise to act on the knowledge we have, even though this knowledge should ultimately prove to be false. From animism have been developed all our science, philosophy, and religion, and it is therefore the historical basis of the church, the school, and a large part of our industrial life.

Animism affects primitive life in all its aspects, manifesting itself in ceremonies, dances, incantations, and puberty rites, as well as in stereotyped methods of work. These ceremonies and incantations have as their purpose the placation of friendly, or the exorcism of evil spirits, and are practiced at the sick-bed, and before a hunt, a military expedition, a harvest, and every other important social activity. The ceremonies are accompanied by some explanations of myths, legends, traditions, and beliefs, and so are incidentally educative. The educative function is especially characteristic of the puberty rites or initiation ceremonies. Near the onset of adolescence the primitive boy is initiated into the status of adulthood by the men of the tribe, and the girl is initiated in a lesser degree by the women. The main purpose of these ceremonies appears to be to give moral and

social training, for the youth is given especially severe practice in endurance, subordination, and self-control; but totemic symbols and religious conceptions are also explained, thus bringing in a modicum of theoretical education. But this education is merely an incidental aspect of a religious rite, and cannot be looked upon as an agency of formal education. It is merely the germ of such an agency, which is not found till we come to the next higher stage of culture known as barbarism.

Barbarism, as distinguished from savagery, begins at the point where the control of such natural forces as fire, water, and wind has been attained, and where stock is raised and the soil is beginning to be cultivated. The arts resulting from these achievements bring about a more settled state of life than is possessed by the savage, and the division of labor, beyond that based on the sexes, is definitely begun. This division of labor is not without its influence on the appearance of the school, but before this institution has been definitely evolved, much time has still to elapse. Practical education is taken care of in barbarism much as it was in savagery. It continues to be carried on in the home and in life, although the arts it deals with have become considerably more complex. But theoretical education, which is bound up with the ceremonial activities, begins gradually to differentiate.

In savagery all the members of the tribe participate in the ceremonial activities on a nearly equal footing, but with the division of labor in barbarism, this ceases to be the case. The ceremonial and religious duties gradually devolve upon those members of the tribe that show a special aptitude in dealing with the unfriendly spirits. These men are variously known by such names as sha-

mans, familiars, wizards, and medicine men. They become the leaders in all ceremonial performances, and in addition to their religious duties, the function of teaching also naturally falls to their lot. They instruct all the members of the tribe in the approved methods of work and in the ceremonial observances, and they give particular instruction to the rising generation of medicine men. It is in connection with the latter function especially that the school has developed. By the time the medicine men have evolved into a priesthood, writing has been invented and the ceremonial observances have been committed into a permanent form. In connection with this written record, cosmologies, philosophies, commentaries, and other forms of literature develop. Practically all of this literature is of a religious nature, and it gives the priesthood a definite subject-matter for study. As this literature develops, more and more specialized educational activities are required, but these are in the main restricted to the priesthood through the entire period of barbarism. Only the exoteric instruction, consisting chiefly of formal directions pertaining to conduct and worship, is given to the people, while the theoretical and literary instruction — the esoteric learning — is reserved for the priesthood alone, for whom schools are early established. But schools for the people do not appear till the next higher stage of civilization is reached. Such schools were not established among the Jews until shortly before the opening of the Christian era, and they were then adjuncts of the synagogues. Among the Mohammedans schools are still nearly always kept in the mosques.

It thus becomes evident that historically the school has evolved from religion or the church. All theoretical

knowledge has developed from the ceremonial and other activities of the church, and as this knowledge accumulated, formal instruction became more and more necessary until schools or universities for the priesthood became an actuality. With the advance of the industrial arts, which gave more and more economic leisure to the young, schools were gradually established for all the people. But these schools continued to be associated with the church until modern times. In America, Germany, and some other countries education has become one of the functions of the state, but the separation between the church and the school, taken the world over, is yet far from complete. In England, for example, there is still a dual control, but strenuous efforts are being made to bring about a complete separation, which promise soon to be successful.

The whole evolution of the school may be traced in epitome by beginning with the overthrow of the Roman Empire by the Teutons. At the time of this overthrow, the Teutons were still in the stage of barbarism, and while they learned rapidly, they were apparently obliged to trace all the steps from barbarism to civilization. The culture of the Greeks and Romans was not directly appropriated by them, but they were compelled to grow into it gradually. By the sixth century Greco-Roman culture had died, and theoretical education and beliefs were as completely in the control of the church as they are in barbaric society. For several centuries the content of the intellectual life was quite closely confined to the Old and New Testaments and the Church Fathers. But after the time of Charlemagne, philosophical inquiry connected with religious dogmas began to develop. This inquiry took place within the church, and produced a

literature that corresponds roughly to the commentaries and philosophies that usually develop in connection with sacred literature. These inquiries received a great impetus in the twelfth century by the rediscovery of Aristotle and other ancient writers, and philosophy was soon on the highway to independence from religion. Science, which was in part an offshoot from philosophy and in part a separate growth in the intellectual soil cultivated by philosophy and religion, shared in this independence. Hand in hand with the branching of philosophy and science from religion occurred the branching of the school from the church.

100. The Church. In tracing the evolution of the school we have also traced the evolution of the church. Many essential details for even a brief outline have necessarily been omitted, but these need not now be supplied. The church is the mother of the school, and therefore has in the past played a most fundamental part in formal education. The differentiation of function in society, however, has removed the heart of formal education from the church and placed it in the school. But this does not leave the church with no formal educational functions to perform, at least not for the present, and especially not in America. Because the church and the state are separate in America, and because religion has not yet been fully rationalized by the method and spirit of science, religious instruction cannot be, or rather is not, included in the public schools; and since the Christian religion centers in the literature of the Hebrews, the child is left ignorant of this literature by the school. But this literature forms one of the most precious sections of our racial inheritance, and therefore is too valuable to be lost. The task of transmitting it to the

child falls to the lot of the home and the church, especially to the church. The church must make a systematic attempt to acquaint the child with our religious history, literature, and beliefs by means of the Sunday school. But before the Sunday school can effectively discharge this function, it must be more generally recognized as an educational agency, it must be taken more seriously by society at large, and its work must be more thoroughly graded, systematized, and psychologized. By the last term is meant that the work must be definitely adapted to the needs and interests of the child, just as the masterpieces of other literatures are adapted to the needs and interests of the child in the public schools. In addition to the Bible, the history and geography of Palestine and the history of the church should also be studied in the Sunday school.

The regular church services as now conducted exist primarily for worship and only secondarily for instruction. They are at best only a semi-formal educational agency. People go to church to be edified, to nourish, rather than to rationalize, the faith they have, and to have a pleasant meeting with friends and acquaintances. The members of the church are mostly adults who have largely lost their plasticity for mental acquisition, and therefore they need the church not so much for the extension of their knowledge as for the exercise of their religious and social nature, for a stimulation and corroboration of their beliefs, and for the maintenance of a life of integrity and Christian charity. In assisting the maintenance of a Christian life, the service of the church renders a training that is distinctly educative.

101. The Home. The home, like the church, is primarily an institution for life and only secondarily an

institution for education. Or, perhaps better, the home has a number of coördinate functions to perform of which education is but one. Among these functions are the providing of food, clothing, and shelter, and the conditions of a wholesome and happy life in general. But the educational function should also be explicitly borne in mind by parents. Parents should first of all assume an intelligent interest in the services that the school and the church are discharging toward their children, to the end that they may coöperate in making the work of these institutions more effective. In the second place, parents should aim consciously to supplement the other educational agencies, especially at those points that are left relatively untouched by them. Such points are the training in rational obedience, in cleanliness, in courtesy, in refinement of manner, in integrity, in kindliness, in the conventions, privileges, and diversions of social life, in the accomplishments of music and dancing, and in the development of special gifts. All of these cannot be undertaken directly by the parents, but the parents should see to it that they are achieved. Instruction in vocal and instrumental music, for example, must usually be provided for by special teachers, but the parents should see that these teachers are engaged and that the children carry out their part of the work.

102. The Apprentice System. Until recently a considerable amount of at least semi-formal education of the practical type was carried on by means of the apprentice system in life, but this is rapidly growing less. With the advance of applied science and the concentration and specialization of industry, it is becoming economically preferable to engage workers that have already been trained. This is throwing technical education on the for-

mal agency of the school, a tendency that we have had occasion to note several times in the preceding chapters. This tendency is removing the last vestige of formal education from vocational activity, and is shifting this activity entirely into the class of informal educational agencies.

Practical education and vocational schools did not evolve from the church as did theoretical education. In the past the practical training of the masses has been quite distinct from the training of the clergy, philosophers, and men of science. This training was carried on either by the home, by the apprentice system, or by guild schools. As a consequence, the study of arithmetic for commercial purposes and technical knowledge of various kinds were not looked upon as educative. This breach between theoretical and practical education still exists, although it is gradually becoming narrower. Theory and practice and the cultural and utilitarian are slowly but surely coming together for the mutual advantage of each. The practical is being idealized, and the cultural is being extended to enrich the lives of all alike.

103. The Informal Agencies. The informal agencies of education include every activity of life not yet discussed in this chapter, and many aspects of the activities that have been discussed. Special mention may be made of libraries, the daily and periodical press, vocational and governmental activities, lyceum lectures, meetings and conferences, travel, social intercourse, the theater, and the playground. None of these agencies exist primarily for the purposes of instruction and training, but instruction and training are nevertheless noteworthy results that follow in their wake. The library should probably be classed as a semi-formal educational

agency, for librarians aim to make the use of the library definitely instructive, especially in the children's department. Vocational activity effectively modifies disposition through the responsibility that it imposes, and it aids in impressing upon the individual the fact of social interdependence. The state is incidentally educative through the administration of justice and through the observance of law and order that it demands. The strong arm of the law develops a respect that may to a considerable extent become generalized. Lectures, meetings, and conferences are meant to be instructive as well as entertaining, and they are usually successful in serving both functions. Social intercourse is its own reward, but we gain from it many a bit of knowledge and deportment in addition. Travel forms one of the most effective liberalizing agencies in the whole round of life's activities, the formal instruction of the school not excepted. In higher education this is recognized, and one's schooling is not considered complete without some foreign as well as domestic travel. Travel gives genuine meaning to the concepts of other peoples and places, widens one's sympathies, and removes many a prejudice. The theater is primarily a place of recreation and entertainment, but neither of these two functions necessarily excludes instruction and moral uplift. The drama has impressed many a moral and social lesson, and it has done this with an effectiveness that rivals the lessons received from the experiences of real life.

The playground has hitherto been an educational agency entirely of the informal type, but in our larger cities this agency is in a measure becoming formalized. There can be no question that the social and moral training the child derives from the give-and-take experi-

ences on the playground is of profound service in later life. It gives the child self-control, facility in dealing with others, and it lays the basis for genuine moral appreciation. The value of this training can undoubtedly be increased by a certain amount of supervision. The supervisor gives direct training in fairness and courtesy by leading the children to practice and appreciate fair play and consideration, and he is a means to a richer fund of experience by making possible a greater variety of amusements.

104. Summary. The agencies of education are both formal and informal. These two classes are mutually supplementary, and both play an essential rôle in life. Because of its close connection with the actualities of life, informal education is especially effective, but it lacks in being unsystematic and in restricting its operations to the occasions at hand. It impresses only the experiences that happen to come, making no overt attempt at completeness and organization for the more effective control of future adjustments, and it leaves a large mass of valuable racial experience untouched. The wisdom of bygone ages is but scantily used. Formal education, on the other hand, is likely to lack in concreteness and reality, but it has the advantages of being systematic, complete, economical, and generally effective. An overt attempt is made to bring all members of the rising generation under the influence of the school, everything valuable to the race, regardless of the time or place of its origin, is aimed to be included in the curriculum, and logical organization and completeness are guiding principles throughout. The charge of lack of concreteness and reality can be, and is being, overcome by proper schoolroom methods.

EXERCISES

1. What arguments may be advanced for the public endowment of the theater?

2. Has the method of placation been entirely displaced by scientific explanation in modern life?

3. To what extent should children be allowed free association with all kinds of children on the playground? Why?

4. How might the Sunday school be made more effective as an educational agency? (See J. V. COLLINS in *Educational Review*, xxxvii, 271 f.)

5. What are the fundamental elements that should be included in religious education? Can these be distinguished from moral education?

6. Mention some specific elements of coöperation that the school may rightly expect of the home. Mention some that the home may rightly expect of the school.

7. Can this statement be justified: "The school was first in the home, and by growth became a separate institution as an extension of the home. The teacher is still said to be *in loco parentis*" (36 : 1).

8. The claim is frequently made that religious instruction is necessary for the education of the heart and for morality. Is this claim justifiable? (See D. W. LARUE in *Educational Review*, xxxvii, 468 f.)

9. Distinguish between the life-giving and the educative functions of the daily, weekly, and periodical press. Point out by concrete instances that the two functions may sometimes be incompatible. May it be arbitrarily said that one of these functions should always be primary?

COLLATERAL READING

BAGLEY, Educative Process, 23–39.
HARRIS, Psychologic Foundations of Education, 264–269.
HORNE, Philosophy of Education, 1–6.
MONROE, Text-Book in the History of Education, 1–15.
O'SHEA, Education as Adjustment, 57–60.

CHAPTER XV

THE PSYCHOLOGICAL BASES OF TEACHING

(A) *Instinct, Interest, Habit*

105. Fundamental Bases. According to the analysis of the field of education given in the introductory chapter, we have now completed the survey of the ground that belongs to the Principles of Education. We have studied the bases on which education rests, we have canvassed the various conceptions of the aim of education, we have resolved the value of education into its elements, we have given an exposition of the curriculum and its essential parts, we have discussed the principles underlying the course of study, and we have considered the agencies through which education is accomplished. All these topics deal primarily with the *what* and the *why* of education, but the last two distinctly approach the question of the *how* of education as well. A detailed consideration of this question belongs to the Principles of Teaching, a province that it is not our purpose to survey, but it will not be out of place to consider the psychological bases on which the teaching process ultimately rests. In considering these bases, we shall restrict ourselves to the discussion of fundamental principles only, leaving the details to the text-books in the Principles of Teaching.

Teaching is made possible (1) by the instinctive activities of the mind, (2) by the modifiability of the

tissue of the nervous system, and (3) by the assimilative power of the mind. These give us the pedagogical topics (1) of interest and attention, (2) of habit and memory, and (3) of apperception and reasoning.

106. Instincts and Capacities. The mind is not a static thing that has to be aroused into activity by the teacher. Activity is an inherent phenomenon of life, and it is expressed both through the body and the mind. When awake, people's minds are always active. Man thinks and acts not only under the stress of some physical need, but for the mere pleasure that he derives from the activities. These activities are not without law, taking place entirely in a chaotic and unorganized fashion, but they are prompted and directed by instincts and capacities which manifest themselves as impulses to feel and to act in measurably definite directions.

Man apparently has all the instincts possessed by the vertebrates beneath him, and he far outstrips his lower brethren in the development of his intellect, which manifests itself in the capacities for knowledge and understanding. Among the instinctive powers that enter into the activities of the school may be mentioned the exercise of the senses, desire for activity, sympathy, fairness, sociability, friendship, love of animals and moving things, desire to be noticed, emulation, fear, pugnacity, ownership, imitation, constructiveness, love of beauty, selective attention, the desire to know, and the capacity to understand. Play, which is usually mentioned as an instinct, is more properly looked upon as the result of the exercise of the various instincts that we have mentioned. These instincts inherently crave activity, and when they are being exercised primarily for the pleasure of the activity, the phenomenon is called "play."

107. Interests. Instincts and capacities are of concern to us in education because they manifest themselves as interests. Every instinctive power manifests itself in its own peculiar type of interest. The child is natively interested in other people, in making friends, in animals, in being noticed, in assisting his fellows, in excelling them, in property, in construction, in seeing, hearing, and touching things, in pictures, and in understanding the objects and phenomena about him. These interests are not static but active. They continually prompt the child to enter into relationship with the things in his environment in active ways. This makes the problem of teaching far less one of arousing interests than of directing them.

Psychologically, interest may be looked upon both from the objective and the subjective point of view. Objectively, interest always attaches to some thing, phenomenon, or relation. That is, interest always has an *object*. We are not merely interested, but we are interested in something. We are interested in books, animals, plants, business, friends, studies, and so on. Subjectively, interest is characterized by *feeling* that attaches to the intellectual representation of the object of interest. To be interested in a thing means to have a certain feeling toward that thing, and this feeling is the bond that holds the object in the focus of attention. It represents, or is, the worth of the object for us.

The feeling that is concerned in interest is not restricted to any one particular group or quality, but it may involve any or all the feelings of which we are capable, and these may be either pleasant or unpleasant. We usually think of the feelings that characterize interest as being pleasant, but this is not necessarily the case.

We may be interested in other people because of fear and hatred as well as love and sympathy, and a piece of bad news may arouse the keenest interest. Grief and worry may not let their objects escape the attention for days. Both pleasant and unpleasant feelings are bound up with activity, but while one, generally speaking, attracts, the other repels.

The production of action is not a third aspect of interest that is added to the objective and the feeling aspects, but it is the immediate physical counterpart of the feeling side of interest itself. Feeling and action cannot be divorced except by mental abstraction, which divorces both from reality. Feeling is but the awareness of the motive or impulse for action, and the action always accompanies the motive unless it is inhibited by another motive.

108. Interests and Education. The first distinction that should be made in considering the relation of interests to education is the distinction between their use as ends and as means. The failure to make this distinction has produced both errors in teaching and confusion in theoretical discussions. Teachers are looking upon interests as ends whenever they are aiming to encourage desirable and to discourage undesirable interests; and they are looking upon interests as means whenever they are using them as motives for the accomplishment of ends other than the immediate objects of the interests themselves.

The use of interests as ends is illustrated by getting people genuinely interested in literature, history, science, philosophy, teaching, law, business, and the like. It is for the development of these interests that the school ultimately exists, and when they have become estab-

lished, it means that permanent relationships between the self and the objects or activities in question have been developed. An interest in literature thus comes to mean a line of activity that is recurrently capable of yielding a high type of satisfaction, and because of this satisfaction is recurrently sought.

The use of interests as means arises from the fact that it is sometimes impossible, or at least difficult, directly to interest a child in a desirable activity. When a case of this kind arises, we may fall back upon the psychological principle of the irradiation of feeling and use another interest as a means. It is a psychological fact that an object not interesting in itself may be made interesting by associating it with an object that is interesting. The interest inhering in the one will spread to the other, and this spreading need in no way decrease the intensity of the interest. It may indeed increase it so that the combination is more interesting than either portion was at the beginning. A child in the lower grades may feel no interest in learning the fundamental processes of arithmetic, but he may be intensely interested in games, and this interest may be made to do service in the arithmetic. The games may be so arranged as to involve addition, subtraction, multiplication, and division, and when a quick and ready knowledge of these processes is necessary to win, the chances are that they will become interesting too. In a similar way a child's native interest in scribbling may be used in writing and drawing, his interests in collecting and in pictures may be used in nature study and geography, his interest in communication in reading and language, and so on. The pedagogical principle involved may be stated as follows: Begin with a native interest, or an interest

already acquired, and graft upon it the new thing you wish to teach. If this is skillfully done, the original interest will radiate to the new thing taught, but it requires native skill and tact, as well as psychological knowledge, to apply this principle.

The interests that the teacher may use as means in education are as numerous as the elements of human nature themselves. A common mistake is made by appealing only to such abstract and remote interests as duty, love of truth, and future usefulness, forgetting that all the native interests mentioned above, as well as all acquired interests, may be properly appealed to in the schoolroom. Emulation, praise, pugnacity, love of friends and parents spur us on in life, and they need be found no less useful as spurs in the school. Many of these interests are natively so strong that they seldom need encouragement as ends; in fact, as ends they may need discouragement, but this does not interfere with their use as means.

109. Right and Wrong Uses of Interest. The use of interest in education has been attended by many blessings, but it has brought along also a number of pitfalls and difficulties. On the one hand, it has given us our vital methods of instruction and delightful school-days, but on the other hand, it has brought forward the charge of "soft pedagogy" and the claim that our teaching lacks virility and moral stamina. This dual situation arises from the fact that interest may be used in wrong as well as in right ways.

Interest is used wrongly (1) by letting the capricious impulses and desires of the child determine the subject-matter of instruction, and (2) by endeavoring to get the child's attention to the subjects taught by means of

external and artificial devices. The first error consists in the fact that the impulses of the child are taken as guides by the teacher instead of being guided by him. If strictly followed, as it never is in practice, this doctrine would lead the race back to barbarism. To say that the child's instincts should be used in education cannot be taken to mean that they should be trusted and followed, but that they should be studied and used as means of leading the child to higher levels. Education has a preparatory as well as an immediate life-giving function, and therefore must look ahead. The assertion of Dewey that "Education is not preparation for life, it is life," should be changed to read, "Education is a preparation for life through life."

The second error has been given the epithet of "sugar-coating." It is pedagogically wrong because it centers the attention of the learner upon the wrong thing. Instead of centering the attention upon the subject-matter taught, it centers it upon the devices and entertainment by which the subject-matter is surrounded, and as a result the real purpose of the lesson is likely to be left unaccomplished. Such devices are legitimate only when they are used as points of departure for a genuine interest in the subject-matter itself, and they are illegitimate to the extent that they fail to bring about such interest, no matter how much pleasure and entertainment they may yield in themselves.

The right uses of interest in education have been given by implication in pointing out the wrong uses. They are the direct counterparts of the wrong uses that we have just discussed. Interest is used rightly (1) by adapting the subject-matter of instruction to the present experiences, powers, and needs of the child, and (2) by

presenting this subject-matter so that the child will appreciate its worth for him. In ultimate analysis, the subject-matter of instruction cannot be chosen by the child himself, but must be selected by standards that are fully appreciated only by the adult.[1] But after it has been selected, it must then be organized and adapted according to the powers and needs of the child. Adult standards decide, for example, that history should be taught, but the present powers and needs of the child determine the order of its presentation. The subject has to be rewritten from the standpoint of the child, and presented in successive cycles that are suited to the status of the child.

The second item in the right use of interest refers to the use of motives and devices as means. Native and acquired interests may be legitimately appealed to in teaching. In fact, they are the only helps to which the teacher can appeal, but this appeal must ever keep the subject-matter of instruction in the foreground of attention. Pictures and museum specimens may indeed be used to bring added interest to the geography class, but this interest should ultimately center in the geographical knowledge acquired, and not in the pictures and specimens as such. The teacher uses interests properly when through them he leads the child to appreciate the worth of the subject-matter of instruction for him.

110. Interest and Effort. By effort is meant the energy and determination expended in reaching the goal of one's interests or desires. Pedagogically, this presents no separate problem from the proper use of interest itself, for it is a link in the same chain with interest. Genuine and legitimate effort is aroused only when the

[1] Cf. chapters vii and viii.

end to be gained is seen to be worthy or interesting; and the greater the interest, the greater the effort that may be aroused in attaining the end. Energy expended in attaining an end whose worth is not recognized should not be dignified by the word "effort," but should be called "strain." A large expenditure of energy is necessary in cases of this kind, and a feeling akin to effort, but distinctly disagreeable, is aroused. This feeling, however, is disagreeable not only because much energy is expended, but because there is a division of motives within the self that is wasteful of energy. While the self would really prefer to do one thing, it is externally compelled to do another, and this literally brings about a condition of strain that devours energy, and that would prove morally harmful if persisted in. The remedy is to be found in the proper application of the doctrine of interest. If possible, the person concerned should at once be led to realize the worth of the end for which he is striving, but if not, a temporary use of artificial incentives must be resorted to.

With the exception of some ramifications into which lack of space forbids us to enter, this, in outline, is the relation of interest and effort according to scientific psychology. There are, however, still in existence remnants of a slowly dying scholastic psychology with which this account is completely at variance. Instead of regarding the self or the will as consisting of the instincts and capacities organized into a functional unity, this psychology regards it as an entity distinct and apart from these instincts and capacities. The self on this assumption becomes an object on which interests and impulses may act, swaying it one way or another, and effort becomes the feeling of the activity of that self or

will in opposing these interests and impulses. Interest and effort thus become opposed and incompatible. Interest is interpreted as having always a base meaning (17 : 35–36), and the desired victory is won when it is subdued. With this account of the relation of interest and effort, the conception outlined above cannot be reconciled. The difference between the two is ultimately a metaphysical one, and to be consistent, one must choose between them; and if one wishes to be scientifically consistent, one must choose the former account.

111. Retentiveness. In addition to the instincts and capacities that manifest themselves in action and conduct on the one side, and in conscious feelings and powers on the other, nerve tissue possesses also the characteristic of modifiability. This is a characteristic that is possessed not only by nerve tissue, but by all living tissue, and even by inanimate matter that is not liquid or gaseous. It arises out of the physical fact that when the molecules of a substance are disturbed, they do not fully resume their original positions.

The psychological and educational importance of the modifiability of nerve tissue is obvious. It is a condition without which neither intelligence nor education would be possible. The sign of intelligence is the ability to profit by past experience, and the sign of educated intelligence includes in addition the ability to profit by the accumulated experiences of others, but neither of these would be possible without the ability to retain experiences to begin with. This makes retentiveness absolutely fundamental in mental life and education, but it is not the sole fundamental. A high development of the instinctive powers is no less necessary. These powers provide and manipulate the experiences, and all that

retentiveness does is to record them. It may do this equally well for the lowest vertebrate as for the greatest genius. The differences in mental ability may be quite unrelated to native retentiveness, even though no mental power whatsoever would be possible without it.

Retentiveness in nerve tissue follows the law of association and manifests itself on the physical side as habit and on the conscious side as associative memory. Any movement or mental action that has once taken place in response to a situation is likely to recur in a similar situation. The original response is guided by instinct, but the instinctive response may be modified and relatively displaced by habit, and by the guidance of consciousness acting on the basis of the data furnished by associative memory.

112. **Habit Formation.** All habits ultimately arise out of instinctive tendencies to movement, but they do so in various degrees of directness and complexity. On the one extreme a habit may arise directly from an instinctive movement that it closely resembles, while on the other extreme it may arise out of a multitude of instinctive movements and other habits, no one of which it closely resembles. Between these two extremes may lie habits of all degrees of difference in their relation to instinctive movements and other habits. The suckling instinct in infants and the pecking instinct in chicks give rise to the type of habits that lie near the first extreme, while speaking and writing may be mentioned as habits that lie near the second extreme. Suckling and pecking are done instinctively to begin with, but they soon harden into habits. These habits are each selected from but one instinctive movement which they closely resemble. There is reason to think that the instincts on

which they are based are transient, as the instinct of the chick to follow the hen and that of the duck to swim certainly are. This makes it necessary for the habit to arise early in order to continue the activity which in each case is necessary to continue the life of the organism. Nature appears to be ultra-economical in the disposition of its energies. Habits are the most economical reactions that an organism has, and nature provides that they must take the place of instincts wherever this is possible.

Speaking and writing cannot each be traced to a single instinct from which it takes its rise. On the contrary, each is selected from a multitude of native reactions. The child naturally makes a great variety of sounds and mouth movements, and from these only one coördinated set is commonly selected to be used in linguistic expression. The selection in this case is apparently made entirely from instinctive movements, for it is made so early in the child's life that probably none of these movements have had time to crystallize into habits. The habit of writing with a pen or a pencil is selected from a variety of instinctive arm and finger movements, for man does not possess an instinct to write any more than he possesses an instinct to speak a particular language. But writing is learned after many arm and finger movements have become habitual, and therefore forms a good example of a habit selected from both instinctive movements and previous habits.

Writing effectively illustrates another factor in habit formation, in addition to the factor of selection and the relation of habit to instinct and to other habits. This is the factor of *association*. Writing does not consist of one single movement like the pecking reflex of the chick,

but it is composed of a variety of movements connected or associated together. This "connectedness" is a feature of all habits and has to be acquired. In simple habits it consists of the connection between the stimulus and the response. Its physical basis is again the modifiability of nerve tissue. The elemental movements in a habit are at first made in succession under the guidance of consciousness, but as the habit becomes established, these become welded together into one series of automatic movements.

The *material* out of which habits are formed may now be summarized as consisting of instincts and other habits, while the *method* of habit formation may be summarized by the words "selection," "association," and "repetition." To this list should in many cases be added the intellectual possession of the *form* of the movement to be accomplished. Thus in learning to write, a pupil should be taught how to hold his pen and how to move his arm and fingers. The idea of the form in all physical actions is more effectively given by example than by precept. Repetition is necessary to fix a habit, but the habit is really begun with the very first movement.

The *motives* that initiate the formation of habits are various, but those that lead the learner to persist in his efforts may all be summarized by the word "satisfaction." The primary motive in learning to speak, for example, is the impulse and desire to imitate, while in learning to write, such motives as emulation, pleasing the teacher, imitation, obedience to request, and fear of punishment may all enter in varying degrees. But when the action has been accomplished, satisfaction results in each case, and this is the primary force that impels the learner to continue in his efforts.

This discussion of the formation of habits contains by implication the principles for breaking habits. In breaking an undesirable habit, a strong motive for doing so should first be made to dominate the mind of the pupil, and the teacher should then see to it that thereafter the manifestation of the habit is followed by dissatisfaction. Whenever possible, another habit should be substituted for the undesirable one. A teacher who is aiming to have his pupils correct an ungrammatical expression that has become habitual should first lead them to realize the error and then to appreciate the right form. This done, the right form should receive drill in attention, and for some time thereafter careful watch should be kept over the expression by the teacher. Every lapse into the wrong form should be promptly checked. With young children whose language is still plastic, wrong expressions may usually be adequately corrected by merely suggesting the right form in a quiet way and having the child adopt it in place of the wrong one. This will in time lead to the establishment of the right form, but drill on these forms is also highly in place in the primary grades.

EXERCISES

1. What is the relation of previous knowledge to interest?
2. Distinguish between the logical and psychological points of view. Between instincts and capacities.
3. Distinguish between interest and attention. After attention has been gained, what is the next psychological step?
4. Is scientific consistency, *i. e.*, a thoroughgoing rationalization of knowledge, an instinctive demand of all minds?
5. Illustrate the use of interest as an end in teaching history; botany; German. Illustrate its use as a means in these subjects.

6. Distinguish psychologically between work and play. Between work and drudgery. Is drudgery ever necessary in school work? Justify your answer.

7. Discuss: "The great problem of education is how to induce the pupil to go through with a course of exertion, in its result good and even agreeable, but immediately and in itself irksome." — ALEXANDER HAMILTON.

8. Distinguish between natural and artificial incentives. An association not connected with any school offers a prize for an essay. Is this prize a natural or an artificial incentive? Is a scholarship society, such as the Phi Beta Kappa, a natural or an artificial incentive? Are artificial incentives ever justifiable in school? What is their baneful psychological effect?

9. Discuss: "As a final test by which to judge any plan of culture, should come the question, — Does it create a pleasurable excitement in the pupil? When in doubt whether a particular mode or arrangement is or is not more in harmony with the foregoing principles than some other, we may safely abide by this criterion. Even when, as considered theoretically, the proposed course seems the best, yet if it produce no interest, or less interest than another course, we should relinquish it; for a child's intellectual instincts are more trustworthy than our reasonings" (70 : 127).

10. Contrast the following quotations: —

a. "In this sphere [volition] we have a special name for those thoughts which influence us directly and lead us to action; we call such thoughts Motives. We also have a special name for the sort of action which is prompted by clearly thought-out motives: Will." — BALDWIN.

b. "In the capacity for attention we find the key to the freedom of the will. Voluntary attention makes the motive. Motive does not make the attention. . . . By sheer force of will power, many a one has withdrawn his attention from certain temptations, centered it elsewhere, and thus developed a counter motive." — HALLECK.

11. Point out the agreement or disagreement of the following views of effort with that adopted in the text: —

a. "It [effort] is the will to do one's duty when one doesn't want to." — HORNE.

b. "It [effort] is adventitious and indeterminate in advance. We can make more or less as we please, and *if* we make enough, we can convert the greatest mental resistance in the least." — WILLIAM JAMES.

c. "Our consciousness of effort is a consciousness of the emotional kind, in which a very large group of sensations of muscular tension is present. Commonly, too, the affective tone of the experience is distinctly unpleasant." — ANGELL.

d. "Keep the faculty of effort alive in you by a little gratuitous exercise every day. That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason than that you would rather not do it." — WILLIAM JAMES.

e. "True effort consists in reinforcing by additional ideas, desires, and motives the side felt to be the weaker. It may be true that action follows the strongest desire, but it is also true that we have the power to call up considerations and feelings that strengthen and that weaken the force of desire." — MCCLELLAN and DEWEY.

COLLATERAL READING

BAGLEY, Educative Process, 95–127.
DEWEY, School and Society, 47–73.
JAMES, Talks to Teachers, 38–115.
KIRKPATRICK, Inductive Psychology, 93–103.
THORNDIKE, Elements of Psychology, 187–213.
THORNDIKE, Principles of Teaching, chaps. iii, v, vii, and viii.

CHAPTER XVI

THE PSYCHOLOGICAL BASES OF TEACHING

(B) *Memory, Perception, Inference*

113. Associative Memory. What habit is on the physical side, the association of ideas is on the mental side. An idea follows a sensory stimulus or another idea just as an habitual movement follows a sensory stimulus or another movement. We do not recall an idea by merely issuing a mental summons to the effect that the idea should forthwith come to consciousness, but we bring the idea back by means of its associates. In recalling a person's name, for example, we cannot do so directly, but we must proceed by thinking of the person's appearance, of the words or sounds that his name resembles, of the places and situations in which we have seen him and have perhaps spoken his name, and so on, trusting that one of these will bring the name back to consciousness. If these things do not recall the name, we cannot make it come, for the mind has no other way of recalling ideas.

Psychologists usually make the statement that ideas are associated and later revived according to two principles, *contiguity* and *similarity*. The sight of Mr. B. may remind me of a picnic at which we were together a year ago, or it may remind me of Mr. G., whom B. resembles. In the first case one idea brings up another because the two have been contiguous in the mind at some previous time, while in the second case the revival

occurs because of a similarity between the two. In revival by similarity, the two ideas need never to have been objectively perceived together, but in revival by contiguity, this simultaneous perception is an indispensable condition.

From the logical standpoint, these two types of association are different, and it is expedient to look upon them as different in education, but psychologically they follow the operation of the same principle. This principle may be stated as follows: *There is a tendency in the mind for any mental state to call up that mental state with which it, or any part of it, has been connected in the past.* Mental or brain connection is psychologically the only basis on which one idea can call up another, although objectively or logically this connection may be brought about in several different ways. Ideas that are experienced together become connected in consciousness by this fact, for by being experienced together they are made parts of one and the same state of consciousness. But similar ideas are also mentally connected by the fact that they arouse similar and even identical states of consciousness. Neurologically, ideas are similar because they are connected in whole or in part with the same brain areas. If through similarity B.'s eyes remind one of G.'s, it is because psychologically B.'s eyes *are* G.'s. They arouse the same conscious state as G.'s eyes would arouse if present, and therefore the two are psychologically identical; and after the idea of G.'s eyes has come to consciousness, it naturally brings with it the ideas of G.'s face, body, and the rest of his personality. Revival through similarity thus turns out to be but one instance of a part of an idea reinstating the whole.

From the logical standpoint, the various forms of association can be grouped into two or more distinct classes, but this cannot be done from the psychological standpoint. From this standpoint they fall into a serial arrangement between two limits like the relation of habits to instincts. These limits are represented on the one extreme by the recall of one total idea by another total connected idea, and on the other extreme by the recall of one idea by but a trace of connection with another idea. Between these two extremes all degrees of connectedness may exist. Only the mind of the genius can run along very partial connections, while in a concrete way even the minds of the lower animals can follow obvious connections. These connections form the basis on which animals are enabled to profit by past experiences. This basis holds also with man, but he can center his attention on connections that are altogether too fine to be noticed by the lower animals. Reasoning is nothing but a method of tracing out and following these partial connections toward a definitely conceived end.

114. Pedagogical Applications. The methods for bringing about connections between ideas do not differ essentially from those used in habit formation. Psychologists distinguish four different principles on which the revivability of ideas depends. These principles are usually called the supplementary laws of association, and are: primacy, recency, frequency, and vividness. To this list should, for practical purposes, be added the factor of logical organization, although this is not logically coördinate with the others.

Primacy and recency are of but little practical importance in the schoolroom. It is true that first impressions are usually lasting and recent impressions are

easily recalled, but the teacher cannot arrange to have everything come either first or last. Still, since first impressions are so important, the teacher should consciously aim to make them pleasant, for, according to the principle of the irradiation of feeling, they may color all subsequent impressions. The last impressions may in a similar way be led to shed a halo of pleasantness over all the related impressions that the student has previously received.

Frequency is but another name for repetition. Other things being equal, those impressions will be most readily recalled that have been most often repeated. We do not forget our names, the alphabet, and kindred subjects because we are continually using them. This factor seems commonplace, and teachers for that reason often despise or neglect it, but psychological tests have shown that it possesses great effectiveness. No matter how well a system of ideas may be worked out logically, or how interesting it may be, repetition is still of primary importance in fixing it in the mind.

Just as frequency stands for repetition, so vividness stands for interest. Other things being equal, we may say again that those impressions will be most readily recalled that were received with the greatest interest. Feeble interest means feeble attention, and feeble attention means feeble modifications in the nerve tissue on which recall depends. Even repetition with feeble interest is of but small avail, while repetition with interest gives the best results. These two factors are in no way incompatible, but are mutually supplementary.

Logical organization consists of the association of facts according to their meaning. On the objective side, the basis of connection in this case is the relation of

cause and effect, which is psychologically but a type of partial association. The separate causal connections that are observed may be condensed into principles or laws, briefly worded, and therefore they may serve as economical keys to the revival of extensive systems of related facts. The principles must indeed be remembered, but the mind is relieved of memorizing many separate facts outright, for these can always be deduced from the principles on which they depend. This is well illustrated by the results of the logical organization of geographical knowledge. The person who has this knowledge based on the principles of mathematical and physical geography has it always at his ready command. He does not need to burden his memory with the separate facts, for these he can infer from the principles. With the principles of climate in mind, he could, for example, readily deduce the seasons and general climatic conditions of Central America; and what is true of geography is true of all knowledge that is logically organized.

Logical organization between different subjects is obtained by means of *correlation*. Subjects may be correlated either *simultaneously* or in *succession*. Related subjects are correlated simultaneously when they appear upon the programme at the same time. Thus English history, English literature, and the geography of England may all be taught during the same term for the distinct advantage of each. Interrelationships will be seen by the students in this arrangement that would be missed if the subjects were taught at widely different times. But it is not always expedient to correlate related subjects simultaneously. It may be impossible for various reasons to teach the three subjects mentioned in the same term, and it is almost sure to be impossible

to teach English, Latin, and German grammar simultaneously. In cases of this kind, correlation need by no means be abandoned, for subjects may be correlated in succession. This means that the interrelationships between subjects may be secured for the student even when the subjects are taught years apart. It merely rests upon the teacher to point out these relationships, or, by skillful assignment and questioning, to lead the students to discover them for themselves. The cross-connections between subjects are so important for the full appreciation of meaning and for the recall and usefulness of knowledge, that teachers may be justly criticised for neglecting successive correlation as much as they do.

115. Processes of Acquisition. The mind is ultimately an instrument for the use and appreciation of knowledge, but before knowledge can be used and appreciated, it must be acquired and retained. The topics that we have studied so far in this and the preceding chapter pertain to the retention and the conditions for the acquisition of knowledge, and it remains for us now to note briefly the *processes* that the mind uses in acquiring knowledge. Using a mechanical figure, we may say that we have studied the parts of the mental machine and the conditions necessary for its efficient working, and that we shall now proceed to study the working of the machine itself.

The mental processes that yield knowledge are perception and inference.

116. Perception. We are perceiving whenever we are reading meaning into our sense impressions. The assertion that a certain odor means a rose, the interpretation of observed colors and dimensions as a book, and

the recognition of a person by sight or by his voice, are all acts of perception.

The data that are used in perception are of two kinds. They consist (1) of present sense impressions with, perhaps, reflexly aroused feeling attitudes, and (2) of implicitly revived memory material. In perceiving a familiar object, such as a book, one usually receives but one set of sensory impressions, while all the other elements of the percept are supplied from within the mind. The sensory impressions consist of the extents of length and breadth, and the sensations of brightness and color, all of which are furnished by the eyes. Tactile and kinæsthetic sensations derived from handling the object may be added to this list, but they are not necessary to perceive a familiar object, such as a book. The meaning of these sensations is supplied by association from within the mind itself, and it consists of the revival in condensed form of all previous experiences had with books. In this revived complex, not only previous sensory experiences, but also associated feeling attitudes play a part. The way we have in the past felt toward books is certainly no less a part of their meaning than the various sensory impressions we have received from them.

The memory material that functions on the subjective side of the perceptive process is the concept. This complex is the one most generally used in all our mental equipment. It functions whenever we are using our knowledge, for all knowledge is held in the mind in the form of meaningful concepts.

The concept may be defined as a symbol plus an associated core of meaning. The symbol is most frequently a word, but it may also be a mental image of some kind.

The word "horse" is the symbol that we usually use to represent our knowledge of a well-known domestic animal, but in our own thinking that knowledge may also be represented by an image of a horse. The meaning of "horse" consists of all the experiences, in condensed form, that we have had with horses.

The data of which concepts are composed are ultimately both sensory and affective. The sensory data are furnished by the sensations coming from both the special and the organic senses, and the affective data consist of the instinctive feeling reactions coming from the brain itself. The concept of a vicious horse, for example, is obtained from visual, auditory, and perhaps kinæsthetic sensations, resulting from direct impression; from kinæsthetic and other organic sensations resulting from the expression of fear; and from the feeling of fear itself. The last item could not be admitted as a mental element distinct from the others by the adherents of the James-Lange theory of the emotions, but this theory in its extreme interpretation is now very generally rejected by psychologists and is disregarded here.

Perception may be defined as the interpretation or assimilation of sense impressions by means of concepts. The resulting product is the percept, which may be defined as the consciousness of an object present to sense. The duality of the process of gaining percepts, however, should not be stressed. In actual practice perception must be looked upon as a unitary adaptive act of the entire organism. The objective and subjective aspects do not stand out as separate parts. This is especially true in the perception of familiar objects. Perception of this kind is a habit, — an adaptive habit, — in which there is but a minimum of revival from within.

The two aspects of the perceptive process are well brought out when an unfamiliar object is perceived. The writer usually leads his classes to analyze this process by exhibiting a small finger-nail clipper, an instrument with which experience has shown him that most members of a class are unfamiliar. On asking what the object is, a variety of answers is received. Pen-knife, cuff-holder, corkscrew, tweezer, and nail-file are usually among the answers given. Still, no one is sure of his interpretation, and not a few want to change their answers several times. This makes it easy to lead the members of the class to see that what they are doing is to ransack their minds for a concept that will fit the object seen.

117. Perception in the Infant Mind. More light is thrown on the nature of the perceptive process by the manner in which knowledge begins in the infant mind. It is evident from the exposition already given that past knowledge is vitally concerned in perception. The sensory impressions coming from a book, a nail-clipper, or any other object could not be interpreted, or apperceived, if the mind had not had previous experience with similar objects. This function of previous experience is so important that the statement is usually made that present sensory impressions are interpreted by knowledge already in the mind. This statement may be acceptable for ordinary discourse, but it does not meet the requirements of adequate scientific exposition. For if knowledge were obtained through the interpretation of present sensory impressions by experiences that had been previously acquired, how could the infant, who has no previous experiences, ever make a beginning at knowledge? How could the infant begin the perceptive, or the apperceptive process? Evidently the state-

ment that past knowledge does the interpreting must be somewhat revised in order to make it possible to answer this question.

In answering the question that we have raised, we must recur to the native instincts and capacities. It is true enough to say that the infant is born with his mind a blank so far as empirical knowledge is concerned, but this is far from saying that his mind is blank in every respect. On the contrary, the entire infant, including his mind, is an active, moving, squirming organism that has capacities both for entering into relation with its environment and for reacting to it. The infant has the senses with their cerebral connections, and the capacities for physical reaction and for conscious feeling, recognition, and recall. Let us now suppose that the infant in his random movements strikes against an object and receives a "bump." This "bump" is reported to the spinal cord and the brain by means of the nerves. From the spinal cord the message is at once reflected to the muscles, where it gives rise to a reflex movement of withdrawal, but a part of the message continues to the brain, and there gives rise to a sensation; — in this case a sensation with an unpleasant feeling tone. The kinæsthetic sensations arising from the reflex movements are also reported to the brain, where they become conscious, and simultaneously with receiving the "bump" the object is seen and a visual picture of it is reported to the brain. All these neural processes modify the organism and leave it different from what it was. Psychologically, they become associated and are remembered. The next time the infant approaches this or a similar object he is not going to conduct himself as he did the first time. He has become a different being and is going

to react differently. Even before he touches the object, the visual sensations received from it will by association reinstate the former unpleasant experience, and the infant will withdraw or avoid the object. This reaction will probably be largely reflex, but consciousness may also play a part, and as the situations become more complex, the guiding factor of consciousness rapidly increases.

The process of acquiring the ability of conscious guidance is naturally more gradual in the infant than the above outline might imply, but it apparently does not differ from this outline in fundamental principle. After the child has reached the age of from twelve to eighteen months, however, the process may often become quite as rapid as the outline depicts. Just one distinctly pleasant or unpleasant experience may be sufficient for the recognition of that experience thereafter.

This exposition should make evident the inadequacy of the assertion that present sensory impressions are interpreted by previously acquired knowledge. This assertion is at best only a half truth, and it implies a separation between the mind and its knowledge that is artificial and misleading. The mind and its knowledge are organically one and cannot be separated except in thought. The mind is not a receptacle in which knowledge is stored, but it is the result of inherited tendencies and acquired impressions that have all become integrated into a functional unity. Neurologically, knowledge consists in brain modifications, and as the mind is the counterpart of the brain, it consists on the mental side in modifications of the inherent mental powers of the brain. Perception must then be defined as *the interpretation of present impressions by the mind*

as modified by previous experience. The illustration of the infant learning to know an object that has given it a "bump" brings out with added clearness that perception is an act of adaptation, and that in this act the entire mind participates, and not merely the knowledge that it possesses.

With this conception of the perceptive process in mind, it is easy to see how knowledge may begin in the infant mind. The infant has a mind full of instinctive powers to begin with. These powers lead him spontaneously into experiences, and the initial meaning of these experiences is revealed to the infant by the reactions to which the stimuli reflexly or instinctively give rise. These reactions would arise even if the impressions that provoke them did not enter consciousness, but these impressions, as well as the consequent reactions, do enter consciousness, their meaning is consciously recognized, they are remembered, and by means of association they become guides for future action.

118. Apperception. In educational literature the word "perception" is now seldom met, but ever since the time of Herbart its place has been taken by the word "apperception." The questions that naturally arise from this fact are: What is the relation between perception and apperception? and, What is the difference between the processes for which these words stand? We have just seen that perception is the process by which present impressions are assimilated by previous experience held in the mind as concepts, and if we should judge from pedagogical literature, these words also define apperception. It is in defining this word especially that the statement is usually made that present impressions are interpreted by knowledge already in the mind. This would

lead to the conclusion that the two words are synonymous, and from the psychological standpoint this conclusion is essentially correct. But from the logical standpoint a slight difference may be made between them. When apperception is used, special reference is made to the *interpretive* or *assimilative side* of the perceptive process. This side, while forming an organic unity with the sensory side, may nevertheless be relatively separated and made the center of attention. Not only may this be done in abstraction, but in a degree it may be done also in practice. A scientist may at one phase of his investigations center his attention primarily on the sensory side of his experiences; he may aim for the time being to get a complete survey of the *facts*, leaving their interpretation relatively in abeyance. This aspect of the process is in logic called *observation*. But after the observations have been made, then the apperceptive or interpretive side of the process may receive the attention, and the meaning of the facts may be sought. This, in fact, is always the scientific method of procedure.

In pursuance of this logical distinction, "apperception" has come to stand in educational literature primarily for the pedagogy of the concept and conception, instead of the pedagogy of perception in its entirety, which would include sensation as well as the concept. The doctrine of apperception teaches that a child can interpret present impressions *only* on the basis of past experiences as these are stored in his mind in the form of concepts or apperceptive bases, and that these concepts or apperceptive bases are ultimately obtained *only* from concrete experiences. It teaches further that unless the means for making connections between words and the realities for which words stand are provided by

the teacher, these connections will in many instances never be made at all. In teaching geography, nature study, physics, chemistry, biology, physiology, and the like, first-hand observation of the objects themselves is the experience necessary for the formation of all basal concepts. Without such concepts (or apperceptive bases), there is danger that the knowledge resulting from all subsequent teaching will be exclusively verbal.

But to say that all basal concepts must rest on experience is not to say that no knowledge whatsoever can be obtained without actual experience with the objects concerned. There are many things in history, geography, and other subjects that it is impracticable, and even impossible, to experience in the concrete, but still we teach these subjects, and we may teach them well. This is made psychologically possible by the fact that the mind has the power to dissociate and recombine its experiences. We gain knowledge of objects not present to sense by recombining experiences that have at some time been present to sense. A child in a non-mountainous region may gain a fairly accurate idea of a mountain by recombining experiences with hills, rocks, trees, and distances. This process may be vitally assisted by pictures, but pictures really assist only in the process of recombination, for the meaning of pictures also depends ultimately on experience.

119. Selective Attention, Inference, and Reasoning. After the scientist has collected his facts and is engaged in the process of interpreting them, he uses a mental process that is technically called "inference." But before we can describe this process we must first note another mental power upon which it depends. This

power is *discrimination* or *selective attention*. Selective attention is manifested whenever one aspect of a complex object, phenomenon, or idea is made the center of attention while the other aspects are relatively neglected. A person may look at an object like a pencil as a whole, or he may center his attention successively on its length, shape, color, weight, composition, hardness, function, etc., and while each aspect is in the focus of attention, the others are in the margin, or even below the threshold. In a similar way, anything else may be divided into elements. The process of dividing an object in this manner is called *analysis*, and when one aspect is retained in the attention at the expense of the others, it is said to have been *abstracted*. An idea, like sweetness, length, or weight, that is gained by means of abstraction is called an *abstract idea*. Such ideas do not stand for objects, but they symbolize aspects or qualities of things merely. People not bearing this fact in mind are frequently led into error by uncritically assuming that the words they use have separate and distinct counterparts in reality.

Inference may be defined as that mental process by means of which a conclusion is reached on the basis of known facts and principles. The conclusion, while based upon these facts and principles, is not explicitly and completely contained in them, but goes beyond them, and this going beyond the experience in hand is the distinguishing characteristic of inference. This characteristic may be illustrated by a chemist who is making a first-hand study of the products that result from the union of acids and metals. After carefully testing and analyzing perhaps a dozen different combinations, he may make the sweeping assertion that a salt is always

among the products of the union between an acid and a metal. This assertion clearly goes beyond the dozen individual instances or truths upon which it rests.

In making an inference no mental powers are used that we have not already considered. These powers are mainly comparison and contrast, analysis, abstraction, and association. In the actual process of inferring, these powers are always applied to *facts*, including by this word abstract principles as well as concrete experiences, and the person who does the inferring must have a *goal* in mind toward which to direct his thought. Without the facts there would be no basis for the inference, while without the goal there would be no guide in handling the facts. The intellect can act only under the guidance of definite purposes, and it must have data with which to work. The chemist mentioned above, for example, must start with a measurably clear idea of what he is aiming to accomplish, and before he can draw any conclusions he must have the facts of a sufficient number of individual reactions between acids and metals before him. As a matter of fact he has in his mind also one or more hypotheses, which are tentative conclusions of what he expects to find. In making his inference he begins by analyzing his facts and recording all aspects that might in any way prove significant. Next, aided and guided by his hypotheses, he abstracts each aspect in succession and compares it with the aspects in the other reactions. If it is common to only one or a few, he rejects it as being of no significance for the present inference; but if it is found to be common to all, he at once associates the agreeing aspects into a general truth or principle which he accepts as his conclusion. Let us assume his conclusion to be that one characteristic product result-

ing from the chemical union of acids and metals is a salt. To reinforce this conclusion, he may next contrast the aspects of his reactions with the aspects of reactions resulting from chemicals other than acids and metals. If these reactions do not contain a salt, they in so far support his original conclusion.

A precisely similar mental process is employed in inferring, for example, the climate of western California from the known facts of California's geographical position and the principles of climate. California is located in the north temperate zone on the Pacific Ocean in the region of the prevailing westerly winds. Analyzing these facts and comparing them with the principles of climate, the conclusion may be abstracted on the basis of association by similarity that western California has a warm, equable climate, with a wet season in the winter and a dry season in the summer.

In discussing inference the student must guard against the impression that this process is distinct from, and unrelated to, perception. A few pages back we made the statement that there were two mental processes that give rise to knowledge, — perception and inference, — but this is only relatively true. Inference is only the interpretive aspect involved in all perception become explicit and carried on in the focus of attention. All perception involves inference, and this may be either implicit or explicit. When a person hears a noise in the street and says a team is driving by, the conclusion is really inferred, but it may follow so directly upon the auditory impressions that the ground upon which it is based does not enter consciousness. That is, the inference is an implicit one that results immediately from the operation of the law of association with a mini-

mum of comparison and selective attention. But if an unfamiliar noise is occurring in the street, no such immediate interpretation follows. The noise will arouse memories of similar noises heard before, with which the present noise will be compared feature by feature. On the basis of this analysis and comparison, the conclusion may be reached that the noise is caused by a traction engine passing by. This is an inference of the explicit type, which may be defined as an inference that is conscious of its ground. The instances of the chemist and the climate of California belong to this type.

120. Inference and Reasoning Distinguished. Reasoning may be distinguished from inference by saying that it consists of a chain of connected inferences, all bearing upon one final conclusion. This makes the inference one of the unitary steps in the reasoning process. It is seldom that one inference suffices in interpreting or explaining a problem, but a series of inferences is required to rationalize it fully. In determining the climate of a place a number of inferences are practically always required, so that we should really speak of reasoning out the climate rather than inferring it. Similarly, it is proper to say that we reason out a proposition in geometry, the conditions of plant life, the laws of falling bodies, and the like. In each case a series of inferences is required to give us our final conclusion.

From the psychological side we have now sufficiently described the processes of inference and reasoning, but on the objective or logical side this description should be carried one step farther. If we examine the instances of the chemist with his acids and metals, and the climate of California again, it becomes evident that in the

former the inference proceeds from particular facts to a *general* conclusion, while in the latter it proceeds from facts and general principles to a *particular* conclusion. Inference or reasoning of the first type is called *inductive*, and of the second type *deductive*. The mental processes involved in each are the same, and the difference between them consists in the data that are used. This difference may be described by saying that inductive reasoning begins with the relatively particular and ends with the relatively general, while deductive proceeds in the reverse fashion. Deduction always involves one or more general truths or principles in its given data, but it also involves relatively particular facts. Technically speaking, the major premise is general, while the minor premise is particular. This makes it impossible to take the presence of particular facts in the premises as the criterion for distinguishing inductive reasoning. But induction may be distinguished by the fact that it always leads to a generalization, which may be either a rule, a definition, a principle, or a law; while deduction may be distinguished by the fact that it always either anticipates or explains a relatively particular fact.

It is highly important for the teacher to understand the reasoning process and to distinguish between induction and deduction in order to teach with intelligence and effectiveness, but to go into the ways and means of applying these things in the schoolroom would take us too far afield in the Principles of Teaching. We may say, however, in concluding this topic, that in teaching children to reason, the teacher should see to it (1) that the children have a clear conception of the goal to be reached; (2) that they possess a sufficient

number of representative facts; (3) that they proceed in a systematic way in analyzing and comparing these facts; (4) that they make intelligent use of hypotheses in drawing their conclusion; and (5) that they make a systematic attempt to verify and to apply the conclusion they have reached.

EXERCISES

1. May the processes of judging and inferring be psychologically or logically distinguished?

2. Where may simultaneous correlation be used more extensively, in the lower or in the higher grades? Why?

3. How would you proceed in leading a class to memorize a short poem? What is your reason for each step?

4. Has psychological thought gained or lost by the introduction of the word "apperception"? Pedagogical thought?

5. Name five or more specific topics that should be taught inductively. Name five or more that should be taught deductively.

6. Distinguish between the psychological and the logical sides of reasoning. With which of these sides is the teacher more concerned?

7. Consult a number of text-books in psychology and determine if the words "judging," "inferring," "reasoning," and "judgment" are used in the same sense by all writers.

8. Between what studies would you recognize the principle of simultaneous correlation in framing the course of study? May successive correlation receive recognition in framing the course of study?

9. What are the five steps of the Herbartian lesson plan? Might these steps be advantageously modified? Are these steps applicable to the deductive lesson as well as to the inductive?

10. A high school graduate did not know that the Julius Cæsar studied in the Latin class, the history class, and the

literature class was the same person. What principle of teaching did his teachers neglect?

11. Point out the place of logical organization in teaching history; grammar; botany; geography; arithmetic; spelling; physics; and Latin. What is the relation of logical organization to memory? May logical organization ever entirely displace specific memory work in the school?

12. A child in the grades did not know that the Mississippi River studied in the geography class was the same as the Mississippi River flowing past his native city. What principle of teaching did his teachers neglect? Give other similar instances of verbalism, pointing out how they might have been avoided.

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